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RECOVERIES FROM RABIES.

BY HAROLD LEENEY, M.R.C.V.S., BRIGHTON.

UNTIL quite recently it has been held that recovery from Rabies is impossible, and with an exceptional experience of this malady, I should have endorsed this opinion, but for two cases, a notice of which may interest the readers of the VETERINARY JOURNAL.

The first was a fox-terrier dog, in whose company I had previously had good sport, and of whose manners I was therefore the better able to judge when he was ill.

He was brought to my infirmary with the mouth open, in the manner so characteristic of Rabies, and so different from that of a mechanical impediment to its closing. The swollen and lacerated tongue, the discolouration, the dryness, the glassy and wandering eye, the snapping at imaginary objects, the thirst, and (what I have insisted upon before) the howl, were all present, and unmistakable to any one who has seen anything of this malady.

For three days the patient remained in about the same condition, which I may remark is not usual, for after the jaw drops, it has been my experience that they get rapidly worse, and die in from three to five days, and often less. Having a sentimental rather than a scientific interest in this case, I thought some degree of relief might be obtained by throwing upon the tongue some solution of chloral, which I did with a syringe, from time to time, and apparently with the result of producing a sedative

effect. Whether or no this really contributed to his recovery, I cannot hazard an opinion; but that he did gradually return to his normal condition I can testify, and in ten days from the time he was admitted he was well, and I saw him rabbiting a year afterwards.

CASE II.

In a lodging-house were two dogs, owned by different persons. The owner of what I will call No. 1 brought him to my infirmary, where he died of unmistakable Rabies. Before he was brought to me, he had bitten No. 2, whose owner would not consent to have him destroyed after the danger had been duly commented upon. Eight weeks afterwards, No. 2 was brought to me with all the appearance of Rabies, and was confined in a safe cage, where he had access to milk and gravy, but no solid food, and no medicine whatever. His symptoms gradually abated, and he made a perfect recovery.

Will either of these dogs be liable in the future?

ANTHRAX IN CACHAR AND MANIPUR, INDIA.

BY J. GRIFFITH EVANS, M.D., ARMY VETERINARY INSPECTOR, MADRAS.

[The following interesting reports, relating to most destructive outbreaks of Anthrax in certain districts in India, were furnished to the Government of that country during last year, and because of their value are now published.]

To the Deputy Commissioner, Cachar.

Silchar, Cachar, *February 3rd*, 1881.

1. SIR,—I have the honour to state, for the information of the Chief Commissioner, that I had the opportunity on the 28th ult. —which I was waiting for—of making a *post-mortem* examination of two ponies which had died of the so-called "Manipuri Disease," on the Bijoypore Tea Garden, Berkholas, and which proved to be Anthrax Fever, commonly known in Bengal as the "Loodiana Disease." No other cases have been reported in the district this season, so that I have had no chance of seeing one alive; but all the reports made to me since I came here led me to believe that the disease was Anthrax, which has been now placed beyond doubt

by the microscopic examination of the blood of these two cases *post-mortem.*

2. *Symptoms.*—The disease is essentially due to the presence of a fungus called the *Bacillus Anthracis* in the blood. The symptoms vary very much, depending upon which of the internal organs may be mostly affected by the yellow gelatinous exudation that is always more or less poured out into the connective tissue, and they may conveniently be grouped into three distinct sets, thus :—

A. *Cerebral.*—Drowsiness and a straggling gait, etc. In these cases the patients sometimes die apparently of apoplexy—in the early stage. They are found dead in the morning, though supposed to be well the previous evening.

B. *Respiratory.*—The most common and dangerous symptom of this group is a swelling of the throat, extending more or less down the neck, and also into the larynx, closing the opening into the windpipe, and causing death by suffocation. Probably the greatest number of cases die from suffocation.

C. *Abdominal.*—When the abdominal organs are mostly affected the symptoms are very like those of colic, or of common inflammation of the bowels.

3. In a large number of cases which do not terminate soon, there are indications of each of these groups of organs being more or less affected.

4. There is always a high degree of fever present, manifested by the high temperature of the blood, as indicated by a thermometer placed in the rectum or by the feel of the fingers placed in the mouth. In most cases, also, there is a sluggishness of disposition for a day or two before any more serious symptoms appear, though the animal may not refuse food or appear otherwise ill. It would be advisable, therefore, whenever gentlemen notice their ponies unusually sluggish, to feel the temperature of the mouth with the hand, and if it is hot take warning. A high temperature is very characteristic of the early stage.

5. *Incubation.*—The stage of incubation, or the period from when the virus is taken into the system until the first symptoms of the disease appear, is not exactly defined. In Bengal it is supposed to be not more than four or five days. I have received no

evidence upon this subject in Cachar, but Captain Willans, R.E., and Dr. O'Brien, Civil Surgeon at Shillong, have reported very interesting cases to me, which appear to have been in the stage of incubation for six or seven days at least.

6. *Mortality.*—I have not heard of a case recovering from this disease in Cachar, and few, if any, have survived more than twenty-four or forty-eight hours. The cases reported to me at Gauhati likewise all died in a very short time, with the exception of one or two. But the cases at Nungpoh (thirty miles from Gauhati, on the Shillong road) lasted about ten days on the average, yet none of them recovered.

7. I have received no evidence of the disease affecting cattle in Cachar; but Captain Willans, R.E., in charge of the Shillong and Gauhati road and tonga service, informed me that many cattle died suddenly when at work near Nungpoh last year. The symptoms are not well recorded, but I am of opinion the disease was Anthrax.

8. *Remedy.*—I am very sorry to say that no cure has yet been discovered. The chances of recovery depend (1) upon the intensity and amount of the virus taken into the system, and (2) upon the group of organs chiefly affected by the exudation. In Bengal the rule is, when a large number of horses are attacked about the same time at one station, those attacked at the commencement of the outbreak all die quickly; those next attacked have the disease less acutely, and many of them recover; those attacked last have the disease lightly, and most, if not all of them, recover.

9. *Infection.*—The virus of the disease appears to be associated most intimately with the spores of the bacillus in the blood. I have examined many cases in Bengal and the Punjab, but I never found spores developed in the bacillus before the death of the animal affected, though I found them a few hours after death. In accordance with that also, I have found no good evidence, in this district any more than in Bengal, of the disease having been communicated by one animal to another before death. Horses standing alongside of an affected animal are not apparently very liable to take the disease; but it would be rash to say there is no danger, especially should the sick animal have a discharge from

the nose, which might by some chance be transferred to the mouth or nose of a healthy animal standing near; for I have found the *Bacillus Anthracis* in the nasal discharge. Therefore it is always advisable to segregate cases of Anthrax as early as possible. It is common for horses standing in the same stable to get the disease about the same time—not from each other, but from having been subjected to the same common cause.

10. But though the living animal is not very likely to transmit the disease to others, the dead animal is exceedingly dangerous, and the greatest care should be taken, therefore, in the disposal of the carcase, as the following facts show.

11. The fatal disease among the wool and hair-sorters, which has caused much excitement at Bradford lately, has been proved to be Anthrax Fever. The wool and hair-sorters got it from breathing the dust rising from the wool and hair brought from abroad, which was no doubt taken from, or had been in contact with, animals which died of Anthrax. The refuse water, after washing that wool or hair, was allowed to run over a grass field for the purpose of irrigation. Cattle were allowed to graze afterwards on that field; some of them got the disease and died, though it was not known in the district before, nor among any cattle there since which were not in that field.

12. The spores of the *Bacillus Anthracis* are wonderfully tenacious of vitality, and they remain in the ground or dried elsewhere for an indefinite length of time, ready to develop and propagate the disease whenever they are conveyed into suitable blood. It has been proved that when animals have been buried deep in the ground, the earthworms bring the spores again to the surface after a long time. I quote the following from the *British Medical Journal* of the 25th December last. "Pasteur's recent researches on the etiology of charbon (a form of Anthrax) show that this earth-mould positively contains the specific germs which propagate the disease, and that the same specific germs are found within the intestines of worms. The parasitic organism or bacteridium, which, inoculated from a diseased to a healthy animal, propagates the specific disease, may be destroyed by putrefaction after burial But before this process has been completed, germs or spores may have been formed which will resist the putrefaction process for

many years, and lie in a condition of latent life, like a grain of corn or any flower-seed, ready to germinate and to communicate the specific disease. In a field in the Jura, where a diseased cow had been buried two years before at a depth of nearly seven feet, the surface earth not having been disturbed in the interval, Pasteur found that the mould contained germs which, introduced by inoculation into a guinea-pig, produced charbon and death. Further, if a worm be taken from an infected spot, the earth in the alimentary canal of the worm contains these spores or germs of charbon, which, inoculated, propagate the disease. And the mould deposited on the surface by worms, when dried into dust, is blown over the grass and plants on which the cattle feed, and may thus spread disease. After various farming operations of tilling and harvest, Pasteur has found the germs just over the graves of diseased cattle, but not to any great distance. After rains or morning dews, the germs of charbon, with a quantity of other germs, were found about the neighbouring plants, and Pasteur suggests that in cemeteries it is very possible that germs capable of propagating diseases of different kinds, quite harmless to the earthworm, may be carried to the surface of the soil, ready to cause disease in the proper animals. The practical inferences in favour of cremation are so strong that in Pasteur's words 'they need not be enforced.'"

13. *Disposal of Carcases.*—If it is not practicable to burn effectually all the carcases of animals which die of Anthrax in this country, I would most strongly urge the necessity of having as little as possible of them cut open, so that no blood may be sprinkled about, and conveyed by the dust, etc., to other animals. It should be buried whole, deep enough to prevent jackals exhuming it, and a large fire of jungle grass or bamboo, etc., made on and about the grave occasionally afterwards to prevent anything which animals would eat growing there, also to destroy the germs which may be brought to the surface by worms. The space should be enclosed by a bamboo rail, and a mark put up to note the place, for the benefit of future tenants of the land.

14. I have no facts to prove that birds or beasts of prey may propagate the spores of the Bacillus with their excreta, but analogy would lead one to suppose they do; for the spores of many other

fungi, as well as the seeds of plants, are sown broadcast by animals in that manner. It would seem therefore advisable not to give the carcases of anthracoid animals to the vultures and jackals.

15. I shall reserve further remarks upon the natural causes favouring the development of the Bacillus and of the disease—also the preventive means—until after I shall have completed my investigations on the Shillong and Gauhati road, whither I proceed from here to-morrow.

The sanitary conditions appear to be somewhat different there from what they are in Cachar.

Calcutta, 12*th March*, 1881.

SIR,—In continuation of my letter, No. $\frac{8}{19}$, of the 3rd ult., I have the honour to state, for the information of the Chief Commissioner, that when I learnt the disease which I had to investigate prevailed more in the adjoining Native State of Manipur than at Cachar, I placed myself in communication with Col. Johnston, the Resident, who has kindly furnished me with the following particulars :—

The Disease in Manipur.—A. The average altitude of the Manipur Valley, a plain of 650 square miles, surrounded by mountains, is 2,550 feet.

B. The disease appears there at all seasons of the year.

C. The soil throughout the valley is a clayey loam. Ponies are confined to the Valley, and the disease appears equally in all parts of it.

D. The disease is said to appear equally among stabled and unstabled ponies.

E. Most of the ponies are fed upon soft succulent grass growing on low inundated land, or on dried up swamps.

F. The percentage of deaths is said to be about seventy, which Col. Johnston thinks is certainly not under the mark. Death, as a rule, comes on in a few hours.

G. The disease is thought to be contagious.

H. Ponies are thought to be perfectly safe from further attacks if they have survived the disease once.

I. The Manipuries have an idea that too hot a stable is likely to bring on the disease, also that it may be brought on by having

ponies out in the dew at night, a belief which Col. Johnston does not share in, as he has never lost a pony by it out of eight or ten, though they are constantly out in all weather.

2. *When came the disease to Assam?*—I have not been able to obtain any exact data as to when the disease appeared first in Cachar, or in the Brahmaputra Valley. Cases have occasionally occurred in Cachar for at least ten years past. Eight ponies belonging to Europeans were attacked in one stable on the Doloo Tea Garden, a high sandy plateau, nine years ago, and they all died within thirty-six hours. I am told that a great many ponies belonging to natives, pasturing loose on the clay rice-fields in that neighbourhood, died of the disease about the same time. The attention of the authorities does not appear to have been particularly drawn to it before the dry season of 1878-9, when it broke out generally as an epizootic, both in Cachar and the Brahmaputra Valley. At Gauhati and in the district, I am told about two-thirds of all the ponies and horses then died. I have received no definite estimate of the mortality in Cachar, but it was certainly very great. It is worthy of notice, in passing, that the disease has not yet appeared in the district of Sylhet, nor on the high Khasi and Jaintia mountains, which separate Cachar from the Brahmaputra Valley, except at Shillong, where a few cases were imported from Nongpoh and Gauhati. In the dry season of 1879-80 the disease was less fatal, and in the present season, now ending, it has been almost absent. I am sure little notice would have been taken of its existence this season if it had not been so fatal in the past few years.

3. "*Epidemic Years.*"—The disease has thus the character of other epizootic and epidemic diseases, such as cholera, small-pox, etc., in having "epidemic years." The parasitic diseases affecting members of the vegetable kingdom, such as the "blight" of wheat, and the "rot" of potatoes, etc., have also their years of devastation.

4. A Manipuri horse-dealer named Narain Sing, who has been living thirteen years at Gauhati, and who appears to know more about horse diseases than any other native there, informed me that he never saw or heard of a case before the dry season

of 1878-9, and that was confirmed by Mr. Bell and Mr. Aitken, tea planters, the oldest European residents at Gauhati. Narain Sing further told me that in his travels afterwards, he found that the disease came up the Brahmaputra that year from Eastern Bengal, and passed on to Upper Assam, causing great mortality among the ponies of the natives everywhere, extending from the river a considerable distance in some places—so far as Nowgong, etc. This, I am informed by the Deputy Surgeon-General, is the usual progress of Cholera also in that valley. Narain Sing in the course of conversation, told me he visited Sylhet last year to buy ponies, and I asked whether he heard of the disease being there, and he replied that the natives of Sylhet knew nothing whatever about it. His "brothers" (Manipuries) living at Sylhet told him the disease had not been there, but was very bad in Cachar.

5. There is good reason for believing that the disease came from Burmah to Manipur, and from thence to Cachar, where its progress has been arrested in that direction.

6. *Causes.*—What can have been the cause of such a sudden general development and extension of the disease? Was it something *per se* travelling invisibly across country on "the wings of the wind," finding more favourable conditions for the manifestation of its presence in some localities than others? or else was it simply a general change in the conditions of life extending over a vast area? Investigations are not yet agreed. Some say the causes are those relating to the geological formation of districts, others think they relate more to the food, others attribute the disease to the drinking water, and others think the virus is in the air.

7. Probably there is an element of truth in each theory, and the cause may be explained thus:—

A. A general change in the conditions of life of the lowest forms of "mould" and microscopic fungi, such as a modification of light, heat, electricity, moisture, etc., allows them to multiply immensely more than usual, and causes the special property of each kind to be intensified, those possessing virus to become more virulent, etc.

B. These organisms are then carried about by the atmospheric

currents with the myriads of other things that are invisible to us, except in the sunbeam, and they are often conveyed a long way from where they are generated. Particles of smoke and sand are daily carried many miles in the air.

C. The danger of infection is in the inverse ratio of the distance from the source, exactly as smelling-salts smell stronger near the mouth of the bottle than a foot from it. When, therefore, several horses in the same stable die the same day, it is probable the source of the virus is not far off.

D. The organisms carried by the air may be deposited in the food or in the drink of horses, or they may be inhaled.

8. Much of the disagreement of investigations is due to hasty conclusions on the "*post hoc, propter hoc*" method of reasoning, each attributing the disease to whatever he finds worst in the sanitary circumstances of the cases which come under his observation, without due regard to other cases.

9. *Geological Conditions.*—The disease is reported to have prevailed on granitic formations in Scotland, Switzerland, Lapland, and Finland, as it does at Gauhati and Nungpoh in Assam; on the Cambrian and Silurian formations in Scotland and America; on the lime in England, Russia, Switzerland, and Malta, and on the old and new red sandstone in England and Scotland. So that the virus cannot be the product of any particular rock formation. There is one geological feature, however, most common wherever the disease is enzootic in the hot season of cold climates, and in the cold season of hot climates, that is, a stiff retentive clay soil, or some rock holding the subsoil water near the surface. In Europe the disease is reported to have disappeared from swampy districts after they have been drained, though it was very common previously. Granite would act like clay in retaining the water, stagnate, and decomposing organic matter. So would also ferruginous conglomerate which is common in Cachar. I examined perpendicular sections over ten yards deep, cut by the river as it passes through the flat lands of Cachar in many places, and found alternate layers of blue clay, sand, and ferruginous conglomerate, each from one to five yards thick. I also examined wells which were of the same character. Deep and wide fissures were made in the low land near Silchar by the

earthquake of January, 1869, from which issued water, the temperature of which was 85°, having a sulphurous smell, also a mixture of sand and clay and ferruginous matter. Mr. Blandford (Superintendent Geological Survey of India) remarked upon this that "the smell of the water and the dark colour of the sand are most probably indications of decomposing organic matter, the presence of which would considerably raise the temperature, and in all probability the water and the sand are from a very moderate depth" (*vide* "Hunter's Statistics of Assam").

10. *Physical Characters of Cachar.—North of the Barak.*—The plain or habitable part of Cachar is surrounded on three sides by high mountains covered with a dense forest jungle, the tarai of which is very malarious, the inhabitants suffering much from intermittent and remittent fevers. The river Barak divides the plain into two parts, having very different physical characters. The country north of the Barak (between it and the mountains) is mostly in plateaux formed of boulders, gravel, sand, and very fine earth-mould, which affords excellent porous soil for the cultivation of tea. The plateaux rise from 50 to 250 feet above the flat, blue clay rice-fields which intervene, and their sides are often very steep. Nearly all this country between the Barak and the mountains is cultivable, there being few permanent swamps in the clay low land, and those not of great extent, compared with the country south of the Barak.

11. *South of the Barak.*—As swamps have long been supposed to be important factors in the causation of Anthrax, I make no apology for quoting the following graphic description from Hunter's "Statistical Account of Cachar":—

"Two large valleys lie to the south of the river Barak, divided by a range of hills running north and south. These valleys are for the most part under water during the rainy season, when they form extensive lakes and marshes. The western one is known as the Hailakandi Valley, the eastern one is the Chatla Fen, at the northern extremity of which is Silchar, the civil station of the district. . . . . It is difficult to give an estimate of the area under water during the rainy season, as it varies much from year to year, and it is not easy to determine where the actual *bil* begins and where the marsh jungle ends, but the dimensions of

the lake-like sheet of water in the Chatla Fen, during three or four months of the rainy season navigable by the boats which supply rice to the neighbouring tea plantations, may, however, be approximately stated to be about twelve miles in length, and two miles in breadth at the widest part.

(To be continued.)

THE DISEASES OF ELEPHANTS.

BY J. A. NUNN, ARMY VETERINARY DEPARTMENT, LAHORE, INDIA.

IN continuation of the series of articles on "The Literature of the Diseases of the Elephant," by Mr. J. H. Steel, A.V.D., that have appeared from time to time in the VETERINARY JOURNAL, I send the following few additional remarks, which may perhaps be of some use to any future investigator. They are gathered from the result of my own experience during my Indian service, but chiefly while over the frontier in Afghanistan. I regret that I have no notes to refer to, as at the time I did not think the matter of sufficient importance to make any, and it was only on reading Mr. Steel's articles that I became aware of the extreme scantiness of the literature of the subject; and on this account only I venture to intrude on your valuable space.

During the Afghan campaign of 1879-80, ten elephants were attached to the battery of artillery to which I then belonged. A constant source of trouble with them was "capped elbows." As is generally known to your readers who have served in the East, the elephant, when about to receive his load, is made to lie down by his "mahout" or driver. When in this position the fore-legs are stretched out in front of the body, with the elbows in contact with the ground. The "mahout" ought to place the "guddee," or thick wadded-cotton cloth that serves as a saddle for him to ride on the animal's neck, on the ground, under the elbows, before the animal lies down; but from carelessness this is frequently neglected, and owing to contact with the hard ground, a large tumour forms on the point of the elbow. If taken in time, and treated by fomentations and friction, these tumours

soon disappear, but in three or four cases that came under my observation, and which had been neglected, an obstinate ulcer formed, which rendered the animal almost useless for the time being, in consequence of the inability to lie down and receive his load.

I had to operate on one occasion on one of these elephants, for what—for want of a better term—I must describe as an ingrowing toe-nail. The outer nail of the left fore-foot had grown to a sharp point in an inward direction : that is to say, with a curve to the right, causing a deep, abraded wound on the left side of the second toe, and laming the elephant. The animal was made to lie down on the right side, by the "mahout," and the feet secured by the picketing chains. I then removed the offending nail with a carpenter's saw. I was astonished at the power of resistance that the nail offered to the instrument, giving the feeling of cutting through a thick piece of Indiarubber. The wound was dressed with "Cher Pine Oil," an impure oil of tar, which was the only thing I had available. The animal completely recovered, and marched down the Khyber on the evacuation of Afghanistan.

The "Cher Pine Oil" is, I believe, obtained from any of the pine family, but chiefly from the "deodar" pine. During the Afghan war, it was extensively used in the Transport Hospital, diluted with linseed oil, as a dressing for mange, which disease broke out extensively amongst the camels. As Mr. Steel remarks, the skin of the elephant is most sensitive, and I have found that the very greatest care is necessary in fitting the pads on which the load is carried ; the slightest gall, if neglected, becoming a most obstinate sore. In the case of an elephant that was returned to the Commissariat Department at Rawul Pindee, after the expedition in 1881, with a sore back about two feet in circumference, I applied a poultice which consisted of a flour sack filled with bran. The animal was moved from Rawul Pindee, but I heard that it eventually recovered.

NOTES ON HILL'S "BOVINE MEDICINE AND SURGERY."

BY A. E. MACGILLIVRAY, BANFF, N.B.

As this is rather an uncommonly well got-up publication, being quite a handsome addition to one's library, and besides is sent forth as "Text Book, Guide, and Book of Reference," it can only be expected by the author that the *material* "within the boards" will be scanned by critical eyes throughout his own profession, and no doubt the criticism will not invariably be favourable; such cannot be expected.

The author did well in dedicating the work to Mr. Fleming, as no one is more worthy of the honour, and besides no name is oftener quoted in its pages than that of *Fleming;* the dedication, therefore, could not well have gone elsewhere.

A great many foreign authorities are quoted—a practice becoming, if anything, just a little too common. A foreign opinion is quite acceptable, and often confirmatory, if not even decisive; but to refer everything to foreign opinion and decision is simply ridiculously unjust, and will no doubt work its own cure.

I have no objections to have foreign authorities quoted in favour of or against any professional communication from my pen, as I am quite able to take care of and speak for myself; but I have the utmost dislike and most serious objection, when I see a whole paragraph quoted *verbatim et literatim* from one of my own communications, and given as being from the pen of Professor Dammann, of the Hanover Veterinary School, *vide* page 542 of Hill's work. This is not only carelessly incorrect, but very unjust. The paragraph referred to will be found in my article on Tubercular Stomatitis in the VETERINARY JOURNAL for June, 1881, and was quoted by Mr. Fleming in his paper on *Diphtheria*, read before the Epidemiological Society, 31st May, 1881, and published in the VETERINARY JOURNAL for September, 1881. As a matter of course, Mr. Fleming acknowledges the proper origin of the said paragraph.

In these days when anything foreign is so highly valued, it is very hard to find one's own words put down as being from a foreign source, and a foreign professor's name tacked to them. No doubt we British veterinarians are only *pigmies* (I use a well-known Professor's designation), in comparison with our Continental *confrères*, as regards experimental research; still, we must be excused for grumbling when our ideas are assigned point blank to a foreign source.

Our author's work is profusely illustrated, both plain and coloured, both original and copied. Plates 9, 10, 11, and 12, are coloured, and refer to what the author is pleased to call, "*Gangrenous Stomatitis, Cancrum oris, Tubercular Stomatitis*," and which he says, "arises from tuberculous diathesis." Further on, he speaks about its assuming a "diphtheritic type," with which latter he thinks the "disease is associated." This definition of the disease is sufficiently complicated—not to say much; so much so that I am almost inclined to assert its utter impossibility. Why, we are told that this one phase of Stomatitis (he describes other two) is at once Gangrenous, Cancerous, Tubercular, and Diphtheritic! Gangrenous and Tubercular Stomatitis are very widely separated diseases; and as for Diphtheritis, it has nothing (distinctly) in common with either. Plates 9 and 11 might be referable to Gangrenous, and Plates 10 and 12 to Tubercular Stomatitis; but all convey but a very mild idea of either of these diseases.

One of the chief attractions of this work, *as advertised*, was, in my eyes, that it was accompanied "with an Appendix on the Practical Inspection of Meat," copiously illustrated with "woodcuts and coloured plates." But, alas! seven poor woodcuts are all I can discover in this much-desired Appendix, and I feel bound to confess that the literary material in said Appendix is quite on a level with the illustrations.

Editorial.

THE VETERINARY SERVICE IN INDIA.

THE position and prospects of veterinary medicine in our Indian Empire have been almost continually under discussion in this Journal, and a number of our readers who are more especially interested in the matter have fully expressed their views thereon. But the subject has hitherto been mainly discussed from a professional or personal point of view, and the great national or imperial interests which are concerned in it have only been lightly touched upon, or at most, treated superficially.

But, as will have been seen from the correspondence published in our last issue, an attempt has at last been made, and evidently with some success, to bring the subject, in all its importance, before the Secretary of State for India, and through him to influence the Viceroy of India to remove what must be considered a dark blot upon our Government of that great country.

It must be remembered that there is no veterinary organization in India—we believe there is not even one civilian veterinary surgeon employed by the Government; in that land, where animal plagues are rife and most destructive, and the losses caused by them are estimated at a minimum sum of six millions of pounds annually, there is not a single sanitary veterinary surgeon, nor yet the faintest attempt made to institute a service to suppress them. The only veterinary surgeons in India are those belonging to the army, and these are too few by one-half, even for their military duties, as is proved by the sickness and discontent prevailing among them. And yet when serious outbreaks of disease occur among cattle, they are detached from their regiments or corps, and sent to combat them as best they may; though only too frequently, from paucity of numbers, and absence of all sanitary regulations, their efforts are of little avail.

It is certainly astonishing, and very discreditable, that nothing should have been done to institute a veterinary sanitary service during the long time we have held India. That it is imperatively necessary such a service should be established—should have been established years ago—is perfectly obvious to all who know the havoc preventable diseases work in India, as the losses and inconvenience they cause form one of the chief reasons for the poverty-stricken condition of the agriculturists there. We do not at all agree with the arguments brought forward by those who assert that contagious diseases cannot be suppressed in India so readily as in this country, because of religious prejudices. No attempt has been made to deal with these diseases in a proper and methodical manner by the Government, and there can be no doubt whatever that when this is done, caste or religious prejudices will be overcome. To deal effectually with these scourges, a veterinary sanitary department should be formed; the three Presidencies should be mapped out into sanitary districts, to each of which a veterinary surgeon ought to be appointed; the function of each veterinary surgeon should be not only to suppress outbreaks of disease, but

to trace the origin of these outbreaks, to diffuse information with regard to them among the people who own animals, and so overcome prejudices with regard to their extinction, to establish improved methods of breeding, rearing, feeding, and utilising animals, and otherwise to assist in developing the resources of India—so far as the domesticated animals are concerned. Surely there is ample occupation here for two or three hundred skilled veterinarians! And we have no hesitation whatever in asserting that no department of the public service in India would confer greater benefit. The expense of maintaining it would be repaid a hundred-fold in a very short time, and the accusation directed against our government of India, that we have done nothing to eradicate the pestilential diseases of animals, or protect the people from their ravages, would soon have no foundation.

At present, veterinary surgeons may be said to be at a heavy discount in India. The army veterinary surgeons are over-worked, ill-paid, and their services ignored. The history of the campaign in Afghanistan, in so far as the treatment of the Army Veterinary Department goes, and the losses among, and horrible cruelty to, animals are concerned, is disheartening, appalling and disgraceful. And even the lessons that campaign should have taught seem to be thrown away, if we are to judge from what occurred in Egypt. With no fewer than six thousand animals embarked from India, the Indian Government only sent two veterinary surgeons! Not only this, but a regiment of Bengal Cavalry was shipped without a veterinary surgeon, or having its horses inspected, though Glanders had been prevalent among them; consequently, when it arrived in Egypt the disease was rife, and a troop, after losing a number of horses, had to be sent away altogether. There is no saying what injury this unpardonable neglect of the Indian Government, through its ignoring veterinary science, may have inflicted on the mounted corps sent from this country.

The Indian Government does its utmost, apparently, to dispense with the services of veterinary surgeons, and to disgust them. Such short-sighted policy is most unprofitable for India, and is every year working incalculable harm. The time has come when something should be done to remedy this unfortunate state of things, and the remedy should be powerful and effective. Nothing but disaster can be looked for from affairs as they exist at present.

CASTRATION-FEVER: CLINICAL OBSERVATIONS ON THE FEVER OF HORSES AFTER CASTRATION.*

BY EUGEN FRÖHNER.

WE rarely find anything in our text-books or periodicals relating to the fever which attends animals after operations. For instance, Hering, in his "Handbook of Veterinary Operations" (3rd edition, page 247), gives the following list of the consequences likely to follow emasculation:—Local

* Translated from the "Repertorium der Thierheilkunde." Jahrgang 43, Heft 4. By G. A. B.

wound reaction, adhesion of the lips of the wound, bleeding, abscess of the scrotum, intestinal and omental scrotal hernia, tetanus, protrusion of the spermatic cord, champignon, induration of the cord and fistulæ, entrance of air and peritonitis ; but no mention is made of the course, intensity, duration, etc., of "Wound-Fever." It is difficult, if not impossible, for the ordinary practitioner to undertake any close observations of the fever which supervenes upon the operations of castration he may be called upon to perform, although reports of such cases would be of considerable value. I have, therefore, endeavoured to put together the few facts I have collected upon this point in the following words. They are based upon observations of one hundred and ninety cases of castration in the clinic of the Munich Veterinary School.

We must first make ourselves acquainted with the method of performing the operation at this institution, as we shall have to revert to some of the methods of manipulation.

A tolerably large incision is made into the scrotum through the common integument and tunica-dartos, and the tunica vaginalis is exposed to view ; *the latter is then divided just sufficient to allow the testicle to be pressed through it.* Then a caustic clam is clasped as high up on the cord as possible, and there fixed. The testicle is now removed, by dividing the cord close to the clam at the posterior part, and about from one-half to one centimetre below the clam at the anterior part of the cord. After twenty-four hours the clam is removed by cutting the ligature on the end of the clam, freeing the clam from the cord, and then separating the latter from the margin of the wound ; the lips of the wound are then grasped by both hands and gently pulled downwards. During this manipulation the spermatic cord usually spontaneously recedes into the scrotum. Of the one hundred and ninety horses which were examined for febrile symptoms directly after castration, fifty-two showed no symptoms at all ; ninety-four presented slight symptoms ; in thirty-four cases the fever was tolerably high, the temperature being about 40° C. ; whilst in ten cases the fever was severe, the temperature registering 41° C. Thus we have the following percentage :—

Castration without fever	27'4	per cent.
„ with slight signs of fever ...	49'4	„
„ with well-developed fever ...	17'9	„
„ with severe febrile symptoms	5'3	„
	100'0	per cent.

As a rule, there is a connection between the frequency of the heart's beats and the height of fever present. In the initial stage of the fever, however, the pulse is often normal, whilst the temperature is at its maximum.

The duration of "Castration-Fever" naturally depends upon its intensity. Thus, in those cases where slight signs of fever were present the duration was from three to five days ; in those cases in which the febrile symptoms were well developed it lasted from six to eight days, or even more, as many of these cases left the hospital before the fever had subsided. Those cases in which the fever was most intense continued the longest, viz., from ten to twelve days, and sometimes longer.

The fever usually commenced about twenty-four hours after the operation, *i.e.*, about the time the clams were removed. The temperature registered the highest on the evening of the same day, and gradually sank during the third and fourth days. At least, this is the case in the larger number of the slight cases.

The following table shows a typical case :—

Before castration	Evening, 6 o'clock	...	38·4° C.
	Morning, 8 „	...	38·2° „
The operation was performed at	10 „		
After the operation	Morning, 11 „	...	38·3° „
	Midday, 12 „	...	38·4° „
	Afternoon, 2 „	...	38·3° „
	„ 4 „	...	38·5° „
	„ 5 „	...	38·7° „
	Evening, 8 „	...	38·8° „
Second day, when the clams were removed	Morning	...	39·2° „
	Midday	...	39·4° „
	Evening	...	39·7° „
Third day after castration ...	Morning	...	39·0° „
	Midday	...	39·1° „
	Evening	...	39·2° „
Fourth day „ ...	Morning	...	38·4° „
	Midday	...	38·5° „
	Evening	...	38·8° „

From this table it will be seen that there was a slight rise of the temperature on the evening of the day the operation was performed. This must, however, be looked upon as very little when the normal evening increase of bodily heat is taken into consideration.

In a few cases the fever increased after it had begun to abate ; but it soon sank to the normal standard again. This occurrence seems to go *pari passu* with certain local wound processes, such as a fresh appearance of the swelling, retention of the discharges, and decomposition.

From these clinical data the following questions arise : What is the cause of these striking variations in the different groups of fever? How can we explain the presence of increased temperature (even up to 41·3° C.) without symptoms of fever being present? What are the causes of the fever after the operation of castration?

It is proved by the 27·4 per cent. above alluded to that castration is not necessarily followed by febrile symptoms, and when it does occur it is termed "Traumatic fever" (*Wundfieber*) ; and as the name implies, it is due to the local changes in the wound. This was the view propounded by Billroth.*

Richard Volkmann † and Alfred Genzmer divided Traumatic, or Wound Fever, into two different forms : 1. A SEPTIC form, produced by the influence of the air causing the wound to inflame, before granulation and suppuration have taken place ; also when pus undergoes certain changes in contact with the air, which are always accompanied with the development of decomposition bacteria. The nature of these changes is not yet sufficiently known, but they go under the collective designation of decomposition. The characteristic of this septic form is the presence of the general symptoms of poisoning, viz., mental depression, which sometimes extends to stupor, loss of power, and abatement of the digestive functions. In the ASCEPTIC form, on the contrary, all these phenomena are wanting ; the general health of the animal is not altered, and the bodily temperature is almost normal, and when it is slightly increased, it is the only clinical symptom of ill-health present.

If we do not take this opinion of Volkmann into consideration when studying Castration-Fever, it will be difficult to come to any definite conclusions from the isolated cases which come under our notice, since these

* Billroth, "Allgem. Chiurg. Pathologie und Therapie" 7 Aufl., p. 97.
† "Sammlung Klin. Vortrag. No. 121. 1878.

present such strikingly different phenomena. With regard to the general demeanour of animals affected with the septic form of "Castration-Fever," the depression of spirits and alteration of the digestive function are always accompanied by a distinct rise of the internal temperature, whilst in other cases the reaction is very slight indeed. The relation of asceptic to the septic form of the fever in the 190 operations mentioned, were as follows: The ninety-four cases in which slight febrile symptoms were present belonged to the *asceptic* form; the thirty-four cases of well-developed fever, and the ten severe cases, may be classed in the *septic* form, as shown in the accompanying percentage table:

Cases without febrile symptoms	27·4	per cent.
„ with *asceptic* form of fever	49·4	„
„ „ *septic* „ „	23·2	„

From this it will be seen that the number of the *septic* fever cases were about the same as those in which no febrile symptoms were developed; and that the proportion of *asceptic* to *septic* forms of fever were as two to one.

Asceptic cases of fever	68·1	per cent.
Septic „ „	31·9	„

The cases in which the fever took on the septic form were characterised by profuse swelling of the scrotum and sheath, which in some cases proceeded along the abdomen, and produced prolapsus of the penis. The intensity and extent of the swellings were in unison with the height of the fever; *i.e.*, as the swelling increased the temperature rose.

The differences of temperature in "Castration-Fever" are principally due to the different forms it assumes; or, in other words, the various causes which produce the fever. Now what are these? Volkmann says that the *asceptic* form is produced by the resorption of HOMOLOGOUS, degenerated, and changed products—products which are not different from those entering into the composition of the body, and which are the result of regressive physiological tissue metamorphosis, and change of matter. On the other hand, he attributes the *septic* form of the fever to absorption of HETEROLOGOUS, poisonous, and putrid matter, or to *septic* decomposition.

The most important question, however, for the practical veterinarian is, How can the septic form of castration-fever be prevented? and has the method of operating anything to do with producing it?

The best answer to this is, to operate as antiseptically as possible. As an experiment, I cleaned and disinfected the clams before applying them, but it did not prevent septic wound fever. Professor Bayer's* communication upon the point is interesting and instructive. He castrated fifteen horses by the antiseptic method (binding the part up in antiseptic bandages, etc.); four of them healed by the primary intention. In one of the cases which healed by the first intention, the temperature of the body rose to 40·2° C. on the fourth day. He also observed that the scrotum and sheath always swelled, even when union of the wound took place at once. Therefore it is patent that however strictly the antiseptic treatment is carried out, it will not always prevent "*septic fever*." Volkmann,† when speaking of treating wounds by the antiseptic method says, "We shall not be very far from the truth if we believe that out of 1,000 wounds properly treated, according to antiseptic principles, one-third will not be followed by febrile

* "Castration unter antiseptischen Cautelen." Adam's Wochenshrift, 1881. No. 46, p. 409.

† *L.c.*, p. 5.

symptoms, one-third may show slight signs, whilst in the other third, the fever will be severe."

Perhaps the method of performing the operation has more to do with the production of the fever than the after treatment; but nothing positive can be known upon this point until the results of the various methods be compared with each other. Prof. Dr. Vogel had the kindness to give me the results of his method, as follows:—Fever is usually very striking. I believe that a small opening in the scrotum and placing the clam too high on the cord, are injurious. Further, a small wound in the scrotum has the disadvantage of the edges uniting too quickly, and thereby prevents the purulent discharge from the sloughing end of the cord escaping, this being a frequent cause of fistulæ. It is also possible that the medicinal agents used on the clam may spread too far; therefore, I have *lately discontinued to use any caustic agent at all, and the result has been far less swelling.* A clam with an iron ring and a smooth surface is just as effectual, and has the advantage of compressing the cord until it is little thicker than paper, and may be removed in a few hours. In many cases the clam is not *long enough*, so that the cord lies in the clam in folds; consequently the pressure is uneven, and swelling is the result. This was also the reason why, in some of my earlier cases, I had slight hæmorrhages; now, however, this never occurs. NONE OF MY OPERATIONS WERE FOLLOWED BY SEVERE WOUND FEVER."

From this we learn that Prof. Vogel is in favour of a *large opening through the scrotum*, and not placing the clam too high on the cord. In the latter point he differs from the majority of operators. With regard to caustic in the clam, Prof. Vogel used, I think, a solution of corrosive sublimate in gum, but I have used a solution in collodion, and have not seen any such bad results as are mentioned by Prof. Vogel. I did not observe any influence upon the intensity of the fever which supervened on the operation, although I took care not to allow the caustic to come in contact with the lips of the wound.

I am not sufficiently acquainted with the other methods of emasculating animals, to give any information with reference to the severity of the fever attending them. Further experiments and knowledge upon this point would be very desirable.

In conclusion, let me draw attention to another cause of increased temperature (fever). I have frequently observed that severe septic fever and swelling of the scrotum and sheath, were at certain times almost constant consequences of castration, whilst at other times it was not so. This I considered was due to some "stable miasma;" a hypothesis which was strengthened by the fact that septic fever was especially prevalent whenever a neighbouring cesspool was nearly full, and required emptying. These cesspools are usually emptied twice a year (in spring and autumn). Therefore, as a prophylactic, these cesspools should be emptied some days before the operation is to be performed, and the animals housed as far as possible from them.

PHYSOSTIGMINUM: AN EXCELLENT REMEDY FOR COLIC, IMPACTION WITH FOOD, AND DYSPEPSIA.

BY PROF. W. DIECKERHOFF, BERLIN.*

FOR several years past two preparations of physostigminum (derived from Calabar bean), viz., the sulphate and salicylicate, have been employed

* Translated from Adam's "Wochenschrift für Thierheilkunde und Viehzucht," by W. F. Garside, Professor of Veterinary Science in the Royal Agricultural College, Cirencester.

externally as myotics. Up to the present, however, they have been but little used in the treatment of internal diseases. The special action which physostigminum exercises on the muscular tissue of the intestines induced me to give it a trial in Impaction, as well as in acute and chronic Dyspepsia.

No essential difference exists in the action of the two salts just mentioned. I used a crystallized sulphate, obtained from Gehe and Co., Dresden. A solution, injected subcutaneously, produced no inflammatory swelling at the point of introduction.

On introducing a watery solution (one-tenth per cent.) into the conjunctival sac, an hour elapsed before any contraction of the pupil took place; this contraction continued for twenty-four hours. No contraction followed the introduction of the solution into the system, either subcutaneously or directly into the veins. On the contrary, after large doses a considerable dilation of the pupil was observed.

If a solution be injected into the jugular, it operates much more quickly and powerfully then when a similar dose is injected subcutaneously. The method I adopted consisted in inserting a hollow needle into the compressed jugular vein, in an upward direction. The escape of blood from the needle indicates that it is within the vein. By means of an appropriate syringe, capable of holding about an ounce, the injection, provided the animal is quiet, is easily accomplished. A glass syringe is preferable. It should hold a quantity sufficient for one dose, so as to avoid the necessity for a second injection.

In about two or three minutes after a full dose of sulphate of physostigminum has been injected into the veins, its action is manifested, and the following symptoms exhibit themselves:—Uneasiness; muscular twitchings, especially in the regions of the shoulders and quarters; powerful contractions of the extensor muscles of the hind extremity; slight colic; outbreaks of perspiration; respirations increased, and somewhat difficult, and sometimes even dyspnœa is present; yawning; slight insalivation; in some cases the internal temperature is raised; peristaltic action of the bowels increased for one or two hours; intestinal murmurs heightened to such a degree as to be audible at a distance of several yards; frequent fæcal evacuations and escape of gas per anus, the later evacuations being usually of a fluid consistence. Larger (poisonous) doses induce tetanic spasms of the extensor muscles of the hind extremity and the intestinal muscular coat; heavy groaning, resulting from the abdominal pain; weakness and transient relaxation of the sphincter ani.

A full dose injected subcutaneously causes, in twenty to forty minutes, somewhat similar symptoms, but less severe in character. No disturbance in the respiratory system or elevation of the temperature occurs.

Smaller doses vary somewhat in their action, the symptoms being by no means constant.

The action of the physostigminum extends to the whole of the intestinal tract. Appropriate doses being succeeded by no important after-results, this agent is particularly well adapted for the treatment of some of the most important intestinal and gastric diseases of horses and cattle. That physostigminum cannot relieve every case of Colic, and that it is incapable of arousing peristaltic action when Enteritis has succeeded Impaction, or when the muscular coat has lost its irritability, I need scarcely say.

The results of my experiments suggest the dose of the sulphate to be from 0·04 to 0·10 grammes (half to one-and-a-half grains), according to the size of the animal. A solution in distilled water (1-100), and the appropriate dose injected either subcutaneously or intravenous, I found to be the most useful. Generally speaking, I think veterinarians would do best to use the subcu-

taneous in preference to the intravenous method, on account of the somewhat severer symptoms which follow the latter. Large doses, I found, were much better tolerated when introduced beneath the skin. In dealing with very heavy horses, I think the dose I have given as maximal might be exceeded. Some animals seemed to bear much larger doses than others.

Where danger is threatened, direct introduction of the agent into the blood-stream is to be recommended.

The following cases are illustrative of the foregoing conclusions:—

No. 1. A glandered gelding, fourteen years of age, condemned to be shot; appetite good, temp. 99·3° F., pulse 40, respirations 15. One-and-a-half grains of physostigminum sulphate dissolved in half an ounce of water, was injected into the right jugular. Two minutes later the respirations were increased and dyspnotic, expression anxious, head depressed, and flow of saliva from mouth. Five minutes after the injection, respirations 62, dyspnœa severe, nostrils being widely dilated, and heaving of the flanks, muscular twitchings over the surface of the whole body, which is maintained in a stiff position, with the head and neck extended. Seven minutes after the injection, evacuation of fæces, severe clonic contractions of the muscles of the quarter, great weakness, pupils not contracted, respirations 68 and dyspnotic, repeated attempts at vomition, two evacuations of fæces. Ten minutes after injection, respirations 64, repeated escape of intestinal gases. Three minutes later, five fæcal evacuations, anus paralysed so that the hand could easily be introduced into the rectum. Twenty minutes after the injection, respirations 52, pulse 35, amount of saliva decreasing, pupils dilated. Thirty minutes after injection, repeated evacuations of semi-solid fæces and gases, respirations 36, dyspnœa less severe, urine escapes in drops, flow of saliva has ceased. Thirty-five minutes after injection, fæces again passed. Forty minutes after injection, respirations 28, and again evacuation of excrement, pulse 32. The horse frequently lies down. The evacuations of fæces were several times repeated subsequent to this time. Three hours after the injection no further action of the agent was noticeable.

No. 2. A Belgian draught mare, aged eight years. Had been suffering for three hours from Colic, induced by overfeeding. Pain moderately severe, pulse 60, respirations 16, no intestinal murmurs. In this case I injected about a grain of the sulphate, dissolved in an ounce of distilled water, into the venous system. A few minutes later there was an anxious expression, respirations 42, pulse 60, twitchings of the abdominal and pelvic muscles. Fifteen minutes after the injection, flow of saliva, respirations dyspnotic and 44 to the minute, pulse 64, attempts at vomition, and escape of gases per anus. After twenty minutes, evacuations of dry fæces, intestinal murmurs distinctly heard on auscultation, pulse 66, respirations 38, and not difficult. Half-an-hour after the injection, frequent pawing with the fore feet, animal lies down frequently and groans, repeated evacuations of fæces and escape of gases. At the end of forty minutes horse somewhat quieter. Four minutes later dry fæces were evacuated, and the process repeated four minutes later. One hour after the injection the animal was perfectly quiet, the respirations being 36, and pulse 58. Repeated evacuations took place at intervals of a few minutes, and were continued for an hour. The animal took some food, and beyond a little weakness, appeared perfectly well two hours after the injection.

The details of two more examples are furnished by Professor Dieckerhoff, but the above will suffice to show the action of the medicine. He then proceeds:—Although I assured myself of the action of physostigminum in several other cases, the above will serve to indicate the value of this agent. No other is capable of exciting the intestinal peristaltic action with such certainty, celerity, or with so little danger to the animal. I consider it,

therefore, as especially applicable in cases of Colic arising from indigestion, whether acute or chronic.

It might probably prove equally efficacious in acute indigestion in cattle, but I have had no opportunity hitherto of testing it in these cases. The dose would probably require a little modification.

ON THE DEVELOPMENT OF THE LIVER-FLUKE (*Distomum hepaticum*).*

BY RUDOLPH LEUCKART.

THE history of the life and development of the *Distomum hepaticum* has occupied my attention for many long years. Very often have I renewed my attempts to infest the molluscs of this country, or at least the commonest among them, by means of the swimming embryos of the entozoon. But all my endeavours in this direction were fruitless until the midsummer of 1879, when I placed in my experimental basins a certain number of small lymnæa I found in the ponds in the Dresden Botanical Gardens, Rossmæssler having informed me that this locality furnished the *Lymnæus minutus* (*L. truncatulus*), a species I had not yet experimented with. To my joy and surprise, a few days afterwards I discovered that a portion of the molluscs were infested by the little parasites, which could be recognized with certainty by comparing them with the embryos swimming about in their vicinity.

They were found more especially at the bottom of the respiratory cavity, sometimes isolated, sometimes collected in large numbers, and they resembled little bladders with a well-defined contour, destitute of cilia, but with two ocular spots more or less distant from one another, with a small cephalic tongue; besides, they offered other characters which placed their origin beyond doubt. The contour of the sac was formed by transparent cells in process of active proliferation, and which were already, here and there, transformed into masses of larger cells.

I then thought that I might conclude that the embryos of the *Distomum hepaticum*, after their enkystment in the *L. minutus* were converted into sporocysts, which, on their part, produced new distomas. But if it seemed to me easy, at the commencement, to follow up the development of our parasite after its fixation, I soon had to change my opinion. The lymnæa which I had gathered were rapidly expended, and although more were sent to me at my urgent request, by Professor Drude, yet they only furnished me with very scanty materials for observation; the molluscs nearly all remained free from the parasites, though the conditions with regard to infection had not changed.

The year 1879 passed without my experiments having made any marked advance, and the following year was still less fruitful, as the materials for research, which I could only obtain in very small quantity, perished before the embryos were hatched. Nevertheless, I frequently had doubts as to the authenticity of the *L. minutus* I employed. In comparing them with the young of other species, I was led to recognize that I had to do with the *L. pereger*. But in my preceding researches I had many times experimented with this species in the adult, or at least in a very advanced stage of growth, but, as I have already said, unsuccessfully. I then remembered that it was chiefly the youngest specimens which were the hosts of the

* From the *Zoologischer Anzeiger*, December 12th, 1881, and *Archives de Zoologie Experimentale*, No. 2, 1882.

parasites in all my experiments, and it entered my mind that it might only be in the very juvenile molluscs that our *Distomum* found all the conditions necessary for its enkystment and metamorphoses, and that the development of the liver-fluke might be, like that of the *Cœnurus*, dependent on the youthfulness of the host.

This prevision was completely verified in the course of the present summer. Having renewed my experiments, I have been successful in infesting several hundreds of young *Lymnæa* (naturally the *L. pereger*), and to observe the development of the parasite.

The more juvenile the molluscs were, the more certain and complete was the infection. In specimens of the size of a pin's head, I have frequently found several dozens of embryos enkysted. The adult snails, or those about half-developed, are almost completely proof against invasion, and even among the larger of the young specimens there are many free from the parasites.

The other species of *Lymnæa* with which I have experimented (*L. palustris*, *L. auricularis*), comport themselves in the same manner. Now and again I have noticed—and particularly in the first-named species—traces of infection; but enkystment rarely takes place, and development is arrested, while the parasites undergo degeneration—a circumstance frequently observed in the case of *L. pereger*.

It is not my intention, in this place, to give a complete *exposé* of my researches, nor to give a history of the development of the *Distomum hepaticum*, so far as I know it; for my observations are not without gaps. This will be done presently; but it may be interesting if I give in a brief manner the principal results.

The embryo of the *Distomum* on escaping from the ovum, already contains all its germinative cells. These occupy the posterior part of the body, while the anterior portion is filled by a granular mass, which there is every reason to regard as corresponding to a rudimentary intestine.

With respect to the germinative cells, they are probably of mesodermic origin. At the part where these cells and the granular mass touch, towards the limit of separation between the anterior and posterior moieties of the body, there is noticed in the deeper layer of the wall of the body, on the right and left sides, a vibratile funnel, which I have described in the supplement to the first volume of my work on parasites (1863, p. 766).

The epidermis is composed of some large cells, which are very regularly arranged in two rows in the posterior part of the body, and have numerous vibratile cilia. In fine, the structure of the embryos resemble in every respect, and in a very striking manner, that of the *Orthonectidæ* of Giard, a circumstance which renders it difficult to believe that these creatures are anything else than Trematodæ, which, beyond their condition of sexual maturity, have not been developed beyond the embryonic stage of the *Distoma*.

The changes which follow the enkystment of the embryos are at first manifested by an exfoliation of epidermic cells. As a consequence, the creatures lose their motility, and their shape alters; they become contracted into an oval mass, and grow so rapidly that the ocular spot which was previously in the form of an X—a form which belongs to the deeper layers of the body, and which becomes more and more elongated—soon divides into two punctiform moieties. The mass of germinative cells in particular assumes an active part in this growth; and it increases in such a manner that it quickly pushes away the rudimentary intestine and occupies the whole of the sac. The cells, themselves, enlarge, and several of them—especially in front—after dividing many times, are converted into a mass of cells of a notable volume, and which soon gives evidence of the first trace or streak of the future progeny.

But what is most astonishing is, that they are not young *Distoma* or *Cercaria* which are thus produced, but *Rediæ*, which so early as the second week are easily recognised, and soon after they are set free, one by one, in rupturing the maternal sac. In each sac the embryos are from five to eight in number. Their body is cylindrical in form, and as in the majority of species, they show at the commencement of the thin posterior extremity two dentiform prolongations directed towards the ventral aspect, and which serve as organs of locomotion, like two rudimentary feet. The cephalic sucker, which is connected with the middle of the body by a girdle-shaped thickening of the cuticle, is very motile, chiefly from the retractor muscles it contains, and which are attached to the cuticular girdle. The margins of the lips can be dilated so as to exercise a powerful degree of suction.

The internal organisation of the Rediæ resembles that of the embryos, except perhaps that the organs, and particularly the digestive apparatus, are more perfect. It is the same with the germinative cells which do not separate anywhere after, it might be said, the formation of the body, but originate at the same time as the other organs, and in an independent manner acquire the condition which they ultimately assume. They arise from the mesoderm, which is observed between the ectoderm and endoderm at a very early period, when the mass of cells therein is in the stage of epibolic gastrule.

Below the pharynx, the rediæ possess a bilobate gland, and in the wall of the body, a little in front of the rudimentary feet, a vibratile funnel on each side.

The germinative cells commence their evolution immediately after the rediæ are set free, and when the latter measure about 0·5. They probably produce a kind of tailless distomum, which does not swim about, but remains in the place where it has been born, and passes on to the mollusc, which nourishes it until it has attained its definitive stage of development. I say "probably," for up to the present time it has been impossible for me to follow these germinative cells to their complete development; as all the Lymnæa which I have succeeded in infesting throughout my experiments died in the course of the fourth week—that is to say, just at the period of development of the distoma.

To admit of the opinion that the creature which is derived from these Rediæ is a tailless distomum, I rely not only on the presence, in great quantity, of the liver-fluke in sheep and cattle, but also on the circumstance that with the *Lymnæus minutus* (and it is true also with regard to the adult specimens sent me by M. Clessin), I have found a Redia which evidently belonged to the same cycle as the liver-fluke, and which contained a tailless distomum.

This creature had already the rod-like covering of the adult animal, but naturally not so thick, and it also possessed the simple forked intestine which Joseph has observed in the young liver-fluke of the sheep.

If my presumptions are correct, they are therefore two small Lymnæa—*L. peregeer* and *L. minutus*—which are the hosts of the liver-fluke: species which have a somewhat different distribution, but which much resemble each other by their frequency and mode of life. Unfortunately, I have not yet experimented with *L. minutus*, this species being completely absent from the neighbourhood of Leipzic, and as I intend to pursue my investigations, I terminate this communication in begging its readers to send me as many and as small *L. minutus* as possible—even those just hatched—in order to enable me to complete these researches, the importance of which are certainly of more than purely scientific interest.

THE DEMODEX FOLLICULORUM.

It is well known that the *Demodex folliculorum*, v. *hominis*, inhabits the follicles and sebaceous glands in the human skin, and particularly that of the nose, forehead, cheeks, and lips. It is often found in the small pimples or acne, so common in certain people, in the little masses of sebaceous material named Comedons. But Virchow states that their presence in these acne is purely accidental, and that in no way are they the determining cause of their formation. In every case they are seldom more than from two to four in each follicle, and have no effect on the general health of the individual.

The *Demodex* has also been found in the cutaneous follicles, and in the excretory ducts of the sebaceous and sudoriparous glands of various of the domesticated animals—such as the dog, cat, sheep, pig, and ox; and they are more numerous, and multiply more rapidly, in animals than in mankind.

These parasites have attracted much attention from veterinarians at different times, but perhaps the most remarkable contribution made to our knowledge respecting them has been furnished by the Austrian veterinary surgeon, Czokor, in a treatise published some time ago, but which has not yet been noticed in this country.

Czokor gives the following characters of this family: *Body* vermiform, oval, or in shape like a laurel leaf, and attenuated at the posterior extremity; *thorax* and *abdomen* not defined from each other; *head* perfectly distinct from the thorax, and lyre or horse-shoe shaped.

The most notable of the members of this family is perhaps the *Demodex* of the pig, discovered by Czokor in 1878, and to which he has given the name of *Demodex phylloïdes suis*—a designation which conveys a good idea of its general aspect. This parasite produces in the pig a pustular and ulcerous affection of the skin, characterised by small tumours, the dimensions of which vary between those of a grain of sand and a small hazel nut. These tumours appear more especially on the nose, neck, inferior part of the chest, inside the arms, and on the belly and flank. They gradually increase in volume, and ultimately become large abscesses, in which, as in the tumours, the Demodex is found.

The following is Czokor's description of this particular parasite. The anterior portion of the head is constituted by two plates, which are the bases of the masticatory apparatus; on this part are two salient points, the eyes; at the inferior extremity of the two plates is an oval cavity—the pharynx, and to the right and left of this the excretory punctiform canal, from the glands of the head; two mandibles joined at the anterior part of the head, which move actively in a horizontal direction, which resemble the blades of scissors, and which are as long as the head itself, though they are only visible on the dorsal surface; two short layers of slightly flexuous chitine, pointed anteriorly and rounded posteriorly, which move horizontally during mastication, but which may unite to form a burrowing or suction apparatus,—these are the maxilla or jaws; two tactile organs, tri-articulated, and fixed in the jaws in a way which allows them great mobility; a single styloid buccal valve, with the oval pharynx depending from it. The integument, which is finely striated in the abdominal region, offers at the head, thorax, and feet very resistant chitinous thickening. The legs, eight in number, appear as short stumps, each composed of three parts; the coxa or haunch, tibia or thigh, and tarsus. Each tarsus carries five chitinous pieces, a kind of claws which appear to be lodged in the soft parts, the external and internal being evidently only the continuation of the border of the tibia. On the middle of the lower face of the thorax is a line of chitine—the sternum. From the pharynx passes a short œsophagus which, provided with two openings, leads

to the stomach, situated in the thoracic cavity, and this again is continued by an intestinal canal which terminates by an anal opening situated immediately behind the end of the sternum. To all appearance there exists a tracheal system ; but as to vessels and nerves these have not yet been discovered, though of their presence there can be no doubt. The sexes are distinct, the male being always smaller than the female. Between the posterior extremity of the sternum and the anal opening is a kind of papilla, which represents the penis. In the body of the female is often observed a triangular body—this is the ovum, which is expelled by an opening situated behind the posterior extremity of the sternum. The ovum is fusiform in shape. The metamorphoses of the parasite comprise three periods : larval, hexapodal, and octopodal.

With regard to the characters of the other members of this group, the following are given by Zurn :—

Demodex folliculorum Hominis.—Male, 30 centimes of a millimetre long, 4 cm. broad. Female, up to 40 cm. long, and 5 cm. broad. Ovum cordiform or fusiform, from 8 cm. long, and 4 cm. broad. Larva hexapodal, 12 cm. long ; Octopodal larva, 36 cm. long ; head short and wide, its length and that of the thorax being equal to one-fourth of the total length of the body. This acarus was discovered in 1842 by G. Simon and Henle.

Demodex folliculorum Canis.—Male, from 22 cm. to 25 cm. long and 45 m. broad. Female, from 25 cm. to 30 cm. long, and 45 m. broad. Ovum fusiform or cordiform, from 7 cm. to 9 cm. long, and 25 m. broad. Larva hexapodal, and 11 cm. long ; octopodal larva, 19 cm. long. The length of the head and thorax is equal to one-third of the total length of the body. This acarus produces the follicular scabies of the dog, and was discovered by Tulk in 1844. Zurn has seen a veterinary surgeon, a coachman, and a woman, who, while attending on dogs affected with Follicular Scabies, had a pustular eruption on the hands and feet, and which was accompanied by a violent pruritis. On examination the Demodex was found in these pustules. He admits, however, that in order to contract the disease a special predisposition must be present ; as it has happened that healthy dogs have associated with diseased ones for a long time without being affected.

Demodex folliculorum Cati.—This was discovered by Mégnin and Leidy on the nose and in the ears of cats. It is one-fourth smaller than the *Demodex Canis.*

Demodex of the Sheep.—Oschatz has found in the Meibomian glands of the sheep a Demodex which is more especially distinguished from that of man by its larger size.

Demodex of the Ox.—This has been described by Faxon. Claus states that he has found the Demodex in the horse and fox, as well as in the ox.

TEXAS FEVER A MATTER OF NATIONAL IMPORTANCE.*

BY D. E. SALMON, D.V.M.

THERE is no infectious disease with which we should be better acquainted than with the so-called Texas or Spanish Fever of cattle. Its ravages have been known and its peculiarities have been a subject of comment in the Northern States for the past ninety years ; while it had existed in certain parts of the South for we know not how many centuries earlier. All the cattle taken to the infected districts of our Southern States to improve the

* From *The Chicago Breeder's Gazette.*

native herds, or to introduce new breeds, have been subject to this affection from time immemorial, and the few which have survived became inured to it, just as a certain proportion of the foreign population of Havana becomes inured to the Yellow Fever. With both of these diseases the immunity acquired in this way has been erroneously ascribed to acclimatization, while in reality it consists either in a natural insusceptibility to these affections, which a few individuals possess, or it is the result of a mild attack, which with these, as with other infectious maladies, protects against the peculiar virus in the future.

Even the beef cattle shipped from Tennessee and the mountains of the Carolinas, Georgia, and Alabama to certain market cities of the South, contract the plague in so short a time that it is nearly impossible, though it be winter, to get them slaughtered before the first symptoms appear; while the number of times which cattle from the South have infected the pastures of more northern latitudes, and destroyed the native stock upon them, has certainly been sufficient to demonstrate, to well informed-men, the dangerous qualities of such animals.

I state these facts, which are a matter of history, and of every-day observation in certain parts of our country, to recall the infinite importance of the subject and the necessity of our stock raisers having correct information, and of keeping it before them, in order that at least a part of the enormous losses may be arrested, which are now of annual occurrence. From time to time in the past, I have endeavoured to call attention to our true condition in regard to this disease, but the light-headed correspondents, not only of our agricultural journals, but of our great dailies, have been so industrious in the dissemination of their peculiar opinions—opinions arrived at by a sort of intuition, and at hundreds of miles from a case of the disease—that many have become sceptical in regard to the way in which the affection is transmitted, or even as to its existence. But the stock raiser in Missouri, Kansas or Indian Territory, who repeatedly and clearly traces his losses to crossing the trail of a Texas herd, or to pastures which such a herd has infected, has no such scepticism; nor had the farmers of the great States of Illinois, Indiana, Ohio, and Kentucky when, in 1867 and 1868, they saw not merely thousands, but tens of thousands, of their native cattle swept away by this pestilence.

The excitement which followed this destruction has long been forgotten, however, and the majority of our farmers have never even heard of Texas Fever; and so every year certain individuals of a speculative turn of mind invest in the cheap cattle of the South, and graze them immediately upon pastures which are also occupied with their native animals. When the heat of July and August has enabled the germs deposited upon the soil to multiply sufficiently, the susceptible native cattle are infected and die, and we are then told of a new and strange disease of the most remarkable virulence. This is the substantial history of hundreds of cases which have occurred, and are continually occurring in North Carolina, Virginia, West Virginia, and other States, and which have furnished the text for the many absurdities lately written, not only by the regular penny-a-liners, but, I am sorry to say, by those as well who claim to be veterinarians.

How important it is, then, that our farmers should accept the fact that in a vast section of our country—a section more than six times the size of England and Scotland combined, and two and a half times the size of France—we have a terribly fatal, indigenous cattle plague permanently located; and that all cattle taken to this district are liable to be infected, while those taken from it, though apparently unaffected themselves, are capable of carrying the germs to infect the pastures and roads on which they travel. This fact, so patent to every observing man, demonstrated over and over again so

many times, and now supported by hundreds and thousands of facts, is nevertheless contested by a majority of farmers, and even in districts where losses are annually occurring there is far from a unanimity of opinion. The losses are ascribed to ticks, to mushrooms, to peculiar characters of the vegetation, to acid in the soil, to something in the air, and, in fact, to anything and everything but the real cause, which there seems to be an extraordinary determination to overlook.

In the Northern and Western States it is not a difficult matter, as a rule, to trace the outbreaks of this disease to the introduction of Southern cattle; but along the border line of the infected district, where cattle are being continually driven, and where most of the roads and commons are infected, it is next to impossible to discover exactly how very many of the cases have originated. And it is just here, where it is doubly important for the people to have clear ideas of its origin and nature, that they utterly refuse in many cases to be convinced—that they will not take the necessary precautions to avoid it, and, as a result, suffer most disastrously.

If the losses from this stupidity were confined to those who ignore so plain a fact, we might be satisfied to allow the matter to rest; but, as I demonstrated in my report to the Department of Agriculture on this disease, the permanently infected district is being continually enlarged in this way—the border line is advancing farther and farther, and it seems to be only a question of time when our whole country will be infected. I say only a question of time, but it may be possible that our stock-owners can yet be roused to an appreciation of the dangers which threaten them, and that they will impress upon their representatives in Congress the necessity of national legislation for controlling such destructive pests. At present we seem to be in the remarkably absurd predicament that the States can make no effective laws, because this would be infringing upon the prerogative of the Federal Government, and Congress will do nothing, for fear of violating the rights of the States; so that, between the two, we are about as helpless as it is possible for a people to be.

It may be that in this respect I am assuming somewhat the character of an alarmist, but there are certain cases in which it is justifiable to sound an alarm. If the colonists of Australia and South Africa had realised what was in store for them by the introduction of Pleuro-pneumonia, would not they gladly have slaughtered the infected animals as soon as discovered, and placed sentries around every infected piece of ground? But they did not realise their danger, and the result was most disastrous to their leading industry; nor do we to-day, as a people, realise the losses that are continually occurring, and the much greater losses that must of necessity follow in the future from Pleuro-pneumonia and Texas Fever, if they are not checked. Any one who understands the nature of Pleuro-pneumonia could have predicted with absolute certainty the result of infecting the ranges of Australia and South Africa with the germs of this disease; and so the result of infecting our pastures with either Lung Plague or Texas Fever may be predicted at this time with the greatest confidence. It is not a question as to whether our people should be aroused and alarmed, but simply as to how this can be done in time to prevent the misfortune that is impending.

We have remained tranquil in the belief that the Texas Fever infection was only permanent in the malarial districts of our South Atlantic and gulf coasts, and that it could under no circumstances resist a heavy frost. But this is a deplorable mistake. Texas Fever and malaria have nothing in common—the infection has extended, and is now permanent in lands perfectly free from malaria; and not only does it resist a heavy frost, but it is not even exterminated by winters when the temperature sinks to zero, or even below.

I have written this to call attention to the importance of the disease; and when I have added that as the plague advances over a new district it not only destroys the greater part of the native cattle, but it makes the raising of these animals practically impossible for ten or twenty years, and that for ever afterwards the introduction of improved stock is attended with the most disheartening losses, the reader cannot fail to see that this importance is not exaggerated.

EXPERIMENTS WITH VACCIN CHARBONNEUX.

DR. KLEIN has made the following communication to the Veterinary Department of the Privy Council through the Local Government Board. "Vaccin charbonneux is to be obtained, and is announced to be obtainable (in the *Farmer*), from M. Bontroux, agent of M. Pasteur in Paris (applicants to M. Pasteur are referred to M. Bontroux), and, as I happen to know, it is brought over, and sold, and used to considerable quantities. The 'vaccin' is sold in tubes (each containing enough lymph for the inoculation of 100 sheep or fifty cattle) as 'Premier vaccin charbonneux' and as 'Deuxième vaccin charbonneux.' The 'premier vaccin,' according to the printed directions accompanying each lot, is inoculated first; after a lapse of twelve to fifteen days, the 'deuxième vaccin' is used in the same manner. The animals thus twice inoculated are supposed to enjoy immunity against fatal Anthrax. I have obtained, through two independent sources, two lots of this vaccin charbonneux (premier and deuxième), and have tested them by experiments.

"The results of these experiments enable me to say: (*a*) animals inoculated with this 'vaccin' (premier and deuxième) are not made immune against fatal Anthrax; and (*b*) both the first and second vaccin may produce fatal Anthrax.

"The following facts prove these propositions.

"1. *Experiments with Lot A.*—Inoculated with 'premier vaccin,' two sheep, two guinea-pigs, and two mice; no change in any animal. Inoculated with 'deuxième vaccin,' the two above sheep and the two above guinea-pigs. One of these sheep showed rise of temperature, and falling off in food for the first two days after this second inoculation, but was all right again after three days. The two guinea-pigs were dead of typical Anthrax within forty-eight hours. The four above mice were inoculated with the blood of one of these guinea-pigs; all four mice were dead of typical Anthrax within forty-eight hours. The two sheep, having been inoculated with the premier and deuxième vaccin, ought to have been immune against fatal Anthrax. Now see what happened; according to M. Pasteur, the *Bacillus anthracis* of blood of an animal dead of Anthrax, when cultivated at 42° to 43° Cent. for twelve days, loses all virulence, and becomes thereby converted into 'vaccin.' I had grown the *Bacillus anthracis* of blood of a guinea-pig dead of Anthrax, at a temperature of 42° to 43° Cent. for twenty-one days, and with this culture I inoculated the above two sheep. The result was that both animals were dead of typical Anthrax within forty-eight hours.

"2. *Experiments with Lot B.*—Inoculated with 'premier vaccin' four guinea-pigs and six mice. Within forty-eight hours, three of the guinea-pigs and three of the mice were dead of typical Anthrax. My method of using the fluids for inoculation absolutely precludes any accidental contamination, and hence these must be accepted as perfectly reliable. This country is comparatively free from Anthrax; and, therefore, the introduction and use of this so-called 'vaccin charbonneux' seems to me most dangerous, and capable of producing incalculable mischief."

We might point out that no satisfactory conclusion can be drawn from such limited experiments as the above. And it must be remembered that mice and guinea-pigs are not reliable animals for such experiments. Only those tests which we have alluded to as having been carried out in France, Germany, and Italy, on large numbers of cattle, sheep, and goats, under the supervision of scientific committees, are alone worthy of confidence, and it is to these we must look for a solution of the problem as to whether this protective inoculation for Anthrax offers all that Pasteur and others have claimed for it. It would be unfair in the extreme, if not foolish, to condemn this inoculation because of the results reported by Dr. Klein, seeing their fallaciousness. We can only regret that this country, the only one of nearly all the European nations, should be averse to carry out a sufficiently extensive and exhaustive series of experiments under proper direction, as if not here, at least in our colonies, there are such enormous losses annually from Anthrax. Experiments on two or three mice or guinea-pigs are certainly, so far as comparative pathology is concerned, a better index of the value our Government places on this subject than a *criterium* of our scientific good sense.

The fallacy of these experiments is exposed in the following observations on them by M. Pasteur :—

"I am much obliged to you for having informed me of the result of Dr. Klein's experiments on *vaccin charbonneux*. These experiments suggest to me the following reflections : The discovery of a means of producing modified virus, and the efficiency of the practical use of such virus in all matters relating to *vaccin charbonneux* have been so thoroughly proved, in various countries, for at least a year, that there is nothing more to be done, in the way of demonstration, to settle the question. It is an accomplished fact that now belongs to science.

"If any experimenter, however competent he may be, and I know that Dr. Klein is very able, fail when he attempts a fresh verification of the question, his duty, in the present condition of science, should be the investigation of the motives by which he is opposed. I have already pointed out that the question of species and race should be taken into consideration. A vaccine which vaccinates rabbits, vaccinates sheep very badly, or to a very small extent. Some breeds of sheep do not tolerate at all, or tolerate very badly, the vaccine which is efficient for another breed. It is advisable that preliminary trials should be made on a small number of individuals, especially if we pass from one country to another, so that we may be assured of the degree of strength of the vaccine ; and if it be desired also to find out what is suitable to new species or varieties, mice and guinea-pigs cannot be used for the trial of sheep-vaccine. There are also, in the kind of experiment under consideration, other sources of possible failure. Thus, I have already pointed out, that in one of the experiments undertaken in Italy, the virulent virus employed was septicæmic as well as anthracic. The vaccinated animals died as well as the non-vaccinated subjects.

"Dr. Klein has, as it appears to me, equally failed in proving that *vaccin charbonneux* loses its virulence when cultivated at 42° to 43° Cent., in contact with the air ; this is because he has not followed the method pointed out by me, and here also he can only blame himself for his failure. The conclusion of the communication to which I am now replying is prudent to the last degree, for it is certainly most unadvisable to introduce *vaccin charbonneux* into a country where Anthrax does not exist."

SURGICAL OPERATIONS ON HORSES.

(*From "Bell's Life."*)

THE new Act relating to veterinary practice will, in all probability, bring about great changes in country quarters, as in almost every parish has been a worthy individual called by the natives a horse doctor, but without any official qualification for that office. At the same time, hundreds of men have been very highly respected in their self-imposed calling, and for downright practical knowledge a great many of them could hardly be excelled. Many now living have had fifty years' daily experience amongst all sorts of cases, and, perhaps, less hampered than they might have been by medical rules, they have worked out the causes of diseases, and found cures for the same by actual practice. It was no wonder, then, that the law and the magnates of the Royal College of Veterinary Surgeons were indisposed to treat such practitioners harshly, though the necessities of the times demanded a special education for veterinary surgeons, and it was doing those who worked hard for the science an injury to allow uneducated men to share the fruits of study and investigation. Wisely was it considered, also, that a man possessing but a very moderate amount of book learning forty years ago might well occupy a different position to any one owning to such deficiencies at the present day. Respectability is now in a great measure decided by education, and there is no reason why a man who cannot attain to a required standard of knowledge should be allowed to fi l posts that are of great public importance. Considering all things, therefore, a limit of five years was quite on the side of leniency towards those not holding the veterinary diploma in future required, but the Act leaves all the old practitioners of above five years' practice in exactly the same position as they have always lived in, and they remain unhampered by any new rules or regulations.

The world is to see the end of them, however, as in another generation none but qualified practitioners, holding diplomas in the same way as in the higher branch of the medical profession, will be allowed to practise at all. No one can complain at this new order of things, as it must tend to raise the veterinary profession to a higher standard of importance, and it will serve also to sweep away a great many abuses that are still continued by the worst classes of local horse doctors, and by some of those possessing great experience, but too old to benefit by what they would call new-fangled ideas and experiments. At a future day none but those who have been enlightened by a due course of study and college training will be qualified to doctor and prescribe for our horses. It becomes, therefore, of more importance than ever to draw attention to those abuses that should be swept away before the new school get fairly settled to their work. Education must have a tendency to soften the heart towards the animal patient in this respect, and a well-trained mind must see that an animal which cannot tell us of all his pains and ailments, and cannot assist himself towards a recovery from any malady, demands even more thought than it is absolutely necessary to bestow on the human subject. Ignorance, or the absence of those special thoughts, may, and probably does, ruin a great number of horses every year, and it has often struck me that ill-shapen horses, shambling goers, and the victims of palpable disease, owe the whole of their misfortunes to some stupidly-devised operations. Firing, nerving, the removing of tumours, and more serious operations, often enough inflict as much injury on a horse by the way in which they are performed as if his ailments were allowed to remain untended. The old-fashioned style at a farm of calling the labourers together to cast the unfortunate patient on a

straw bed, or often enough on a field, with only the turf as a break, and with ropes fixed for the throw, and now pull together to bring the horse down with a crash or a thud sufficient to shake his limbs out of joint, is so very different from the hospital bed or table, with pillows and kind hands for support, and the powers of speech to say if this or that position hurts more or less. Do horses always get over those tremendous throws? and then the lengthened time they are often held down, and all for reasons for which the animal has no cognisance. Half the horse power of the country, at least, goes through this sort of thing, as required by the necessity of castration, and it strikes me very forcibly that a lot of horses are spoilt by that operation. We see horses going weak from the hind quarter, or with no growth of muscle in the thighs, and there is altogether an appearance that at some time or other a wasting process must have taken place which has altered the natural gait and formation of the animal in many points. To those who observe as closely as I am always doing, this view of a horse must have been by no means unfrequent, and those horses that look to be the commonest bred are those that are chiefly notable for the deficiencies I am alluding to. Thoroughbred horses are usually performed upon by skilled veterinary surgeons, and so are valuable hunting colts, but the ordinary country colts very frequently fall under the hands of those who still follow the old-fashioned plans of our forefathers. The wretched colt is not prepared at all for the operation, but the arrival of the horse doctor is the precursor of his being brought up from the field, and the farm hands are called together to assist in casting the colt. There is a lot of noise and bother about adjusting the ropes; Jack or Tom does not do it right, and the doctor sings out to them, the colt, in the meantime, being half-frightened to death, and, amidst his plunges and efforts to get away, and with his forelegs drawn up to his hind, a pull, a long pull, and a pull altogether, gives the poor young brute the biggest fall he has ever had in his life. Then the operation is performed, not over hastily, and somewhat roughly, according to the ideas of scientific veterinaries.

I have seen the operation performed in the rough and tumble way, and in a very scientific way. In the latter case the horse was thrown with the greatest care, and the operator had previously very closely examined the bed, and instructed the helpers, two of them being his own men, his straps being also of his own contrivance. A horse operated upon by this skilful hand I have seen driven in a gig nine days afterwards, but one roughly performed upon I have seen so miserably stiff at the end of three weeks as to be scarcely able to move, and with that crippled appearance of hind-quarter that denotes a probability to my eye of never recovering. He will get right according to ordinary notions, but his walk and all his paces will be cramped, or he will go wide from behind, or be what some people call split up, and years afterwards these detractions will be counted against his make and shape. According to my ideas an immense deal depends upon how this operation is performed, and I consider that owners of colts, for the sake of their own pockets, besides every proper idea of humanity, should consider this subject very deeply before selecting an operator. I have heard that the most skilful hand ever seen in this country was an American. A few years ago I know the operator I allude to performed upon several colts that belonged to a friend of mine, and I was told it was perfectly marvellous how he managed it all, as he never cast his patients, required very little assistance, and applied something that kept down all swelling and inflammation. Most of our own modern veterinary surgeons are, no doubt, skilful operators, and in this department of the profession I feel sure that science has gained many steps upon the old school of horse doctors, however practical the latter may have been in the discovery and treatment of ordinary diseases. The greatest improvement that I have noticed, however, has been the gradual adoption of chloroform by

several veterinary surgeons of my acquaintance in nearly all the operations they are called upon to perform. I am told by an excellent judge that a colt castrated under chloroform is convalescent five times as quickly as one performed upon in the ordinary way, no matter how skilful the operator may be, and that, in upwards of twenty cases, there has not been the smallest trace of mal-effect upon the animals. In such cases I am told it is not necessary to throw the colts, or to let them know that you are handling them at all, the colt being previously taught to come quietly in a halter, and stand still when required. By such a method nearly all shock to the system is avoided, and this is the danger that I maintain is so great in being likely to permanently injure a horse. Do away with the rough handling, and keep the animal from the knowledge that something very hurtful has been done to him by his worst enemy, man, and there can be nothing to fear as to his deteriorating in his natural shape and make. Then why should not the use of chloroform become general for all the operations it may be found necessary to perform upon horses? There can be no objection urged against the expediency of using chloroform on the same plea to be advanced in the case of the human subject, that the administration may be dangerous to life, as, taking the scanty proportions of such accidents in the hands of the faculty, estimated at not one in five hundred, the loss of a horse against the great increase of value of the many safely accounted for, would be of the smallest consideration. At the same time, I do not believe that there would be any danger at all as regards horses, as the evidence of medical men would show that patients unfitted for the administration of chloroform are those having an unusually weak action of the heart. Now, considering the enormous efforts of which horses are capable, it would appear very evident that the action of the heart was more powerful in the horse than in almost any living creature, and that for that reason he should be the best subject of all others for chloroform.

I am told by experienced veterinary surgeons that it is much easier to perform upon a horse under chloroform than when he is under the influence of fright and suffering, and the operation mentioned was nerving, which could be done with the greatest nicety in the interval of insensibility. I should like to see what may be the new era of the veterinary profession, as marked from the present year, when those who commence to practise must do so under a diploma, equally marked by the universal use of chloroform, to lessen the sufferings of animals under veterinary treatment. I bring forward the suggestion as regards horses, because I think thousands will be more fitted for general use by the adoption of such an assistant in necessary operations, and I plead on the score of humanity for animals that cannot speak to us to tell us how they suffer for our service, and do not understand that the treatment to which we put them may be for their ultimate benefit.

GENERAL SIR F. FITZWYGRAM'S VETERINARY PRIZES, 1883.

THE next examination for the Veterinary Prizes given by Sir F. Fitzwygram, will take place in London, at the R.C.V.S., 10, Red Lion Square, and in Edinburgh (by the kind consent of the Directors) at the chambers of the Highland and Agricultural Society, George IV. Bridge, at 10 a.m. on second Wednesday in May, 1883.

These prizes are open to members of the R.C.V.S. who have obtained their diploma since the last examination, and who have passed with "Great" or "Very Great Credit." The examination will be both written and practical. Marks will be assigned to written answers as under:—Physiology,

300 ; pathology, 300 ; anatomy, 300. Three hours will be allowed for each of the above subjects. Sixty per cent. of marks must be obtained in each subject.

The five best candidates, having qualified as above, will be allowed to proceed to the *practical* examination.

Six hundred marks will be assigned to horse practice, and 600 marks to cattle. Two hours will be allowed for the examination of each candidate in horse, and two hours for examination in cattle practice. A candidate failing to obtain sixty per cent. marks in horse practice, or forty per cent. in cattle practice, will be disqualified.

The practical examination will be held at such place, and at such times as may suit the examiners and the majority of the candidates. The prizes are —1st, £50 ; 2nd, £30 ; 3rd, £20. Actual travelling and hotel expenses, not exceeding £5, will be allowed to each of the five selected candidates. The names of the intending competitors must be sent to the Secretary, R.C.V.S., four days before the date of the examination.

Memorandum.

The examination papers, with number cards, and blank sheets or books for the competitors to write upon, will be forwarded under cover to the superintendents or other appointed persons, so as to be received by them as near the day fixed for examination as possible.

Writing materials for each competitor will be provided, and all arrangements for the accommodation of the competitors completed, before the hour fixed for opening the envelope containing the questions.

Competitors should be in their places at the time appointed : no extra time will be allowed to competitors who come in late ; they will, however, be allowed to take their place if they come in *before* any one has left the room.

Further information can be obtained from the Secretary, R.C.V.S., 10, Red Lion Square, W.C.

Aldershot ; *September*, 1882.

Proceedings of Veterinary Medical Societies, &c.

CENTRAL VETERINARY MEDICAL SOCIETY.

THE twelfth annual meeting of this society was held on the 5th October at 10, Red Lion Square.

Mr. J. Woodger was re-elected president, and the vice-presidents chosen were Messrs. Fleming, Axe, Rowe, and Shaw. Nine ordinary meetings have been held during the session, with a good attendance of Fellows, and the following subjects have been brought under debate :—

1. Some of the Diseases of the Brain Affecting the Horse. (Essay by H. J. Hancock.)
2. Infection and Influenza. (Essay by A. Broad.)
3. Uses of Hot and Cold Water in Veterinary Practice. (Essay by W. Hunting.)
4. Laryngismus Paralyticus. (Essay by C. Sheather.)
5. Rabies, a discussion. The subject being introduced by Mr. Fleming.

The following were the most important among the pathological specimens shown :—

Osseous Nasal Polypus, Urinary Calculi, Vesical Calculus, in which a large piece of stick was imbedded, Fractured Pelvis, Lungs of a Duck

(Gregarinosis), Malformation of Head (horse), Tumour in Colon, Irregular Substances in Horse's Heart, Nasal Polypus (pig), Foreign Bodies in Dogs' Stomachs, Cerebral Tumours (horse), Specimens illustrating a Serious Disorder affecting Fowls.

From the essays already promised, and the interest shown by the Fellows a very satisfactory session is anticipated.

IRISH CENTRAL VETERINARY MEDICAL SOCIETY.

THE third regular meeting of the above Society was held at the Grosvenor Hotel, Dublin, on the 31st day of August, 1882. Present:—Messrs. T. D. Lambert, President; J. Malcolm, T. H. Simcocks, and A. G. Ross, Vice-Presidents; L. Hunter, P. A. Lawlor, J. Freeman, A. J. Kelly, I. J. Sperring, Dublin. Messrs. J. Preston, Mallow; John Bell, Clonmel; W. Pallin, Curragh Camp; T. H. Prior, Parsonstown; J. D. Lambert, Army Veterinary Department. Visitors: Messrs. Alex. Lawson, Manchester; S. Lambert, Dr. Prior, Parsonstown; R. Kernaghan, Ballymena; Clancy, veterinary student; Robinson, Greenock.

The minutes of the last meeting were read and signed. Letters of apology were read from Messrs. Jas. Ashe, Hedley, Muir, and Miller for non-attendance.

A letter from Mr. Banham, of Cambridge, as to the proposed British National Veterinary Association, was read by the Secretary; and Messrs. T. D. Lambert, President, and Mr. John Malcolm, Vice-President, were unanimously elected as representatives of the Society in that behalf.

A circular letter from Mr. J. B. Martin, of Rochester, as to the proposed "Fleming Testimonial," was read, and on the motion of Mr. T. H. Simcocks, seconded by Mr. P. A. Lawlor, it was resolved that a subscription of five guineas should be given on behalf of this Society, as a testimony of the esteem of the members for Mr. Fleming, and their appreciation of the brilliant talent and indefatigable energy of that gentleman in the cause of our science.

The question of holding the meetings in an hotel was again introduced for discussion, and it was ultimately—on the motion of Mr. John Malcolm, seconded by Mr. W. Pallin—resolved that the Secretary be instructed to apply to the Royal Dublin Society for permission to use a room for the purposes of holding the quarterly meetings of this Society.

Mr. JOHN BELL proposed the name of Mr. J. Peard, of Cork, which was seconded by Mr. W. PALLIN. The ballot for this gentleman to take place next meeting.

Mr. T. H. SIMCOCKS moved: "That in the opinion of the members of this Society, the examining Board of the Royal College of Veterinary Surgeons should be exclusively composed of members of the veterinary profession; that we pledge ourselves to support any measure which may be brought forward for the attainment of this object; and that the Secretary be requested to forward a copy of this resolution to the Secretary of the Royal College of Veterinary Surgeons."

This was seconded by Mr. W. PALLIN; who expressed—in common with all the members who took part in the discussion—his belief in the desirability of veterinary students being examined entirely by veterinary surgeons. It was the opinion of all the members present, that although the co-ordination of the medical with the veterinary profession was desirable in many ways, yet that our students should be examined by members of the medical faculty was an anomaly which reflected but small credit on us as a profession, and that until it was removed we should fail to command that respect which the

profession would obtain by examining its own students. The resolution was carried unanimously and with acclamation.

The SECRETARY read a letter from Mr. George Fleming, honorary associate of the Society (who had previously intimated his intention of being present, and introducing a paper, at this meeting), expressing his regret that the state of his health compelled him to go abroad for a short time, and that he would consequently be unable to be present, but at some future meeting he would endeavour to fulfil his promise.

The PRESIDENT then called upon Mr. T. H. Simcocks, of Drogheda, to read his paper on "Castration."

He read as follows:—Gentlemen,—In choosing for the subject of my paper "Castration in the Horse," I feel that I have selected a topic which, though I trust may lead to some useful discussion, does not admit of much originality of treatment on my part, but the practical importance of the matter deserves our consideration.

By the term "Castration," we describe a surgical operation which has for its object the deprivation of an animal of the faculty of reproduction, either by destroying the functions of the essential organs of generation or by entirely removing those organs, which in the male are the testicles.

This operation, which is a very ancient one, is practised on all animals, even man himself, but for the purposes of this paper I intend to confine my observations to the equine species.

Castration was commonly performed on their horses by the ancient Egyptians and Jews, and we even find mention made of this operation in the "Pentateuch," while Aristotle speak of its being known in Greece 400 years before Christ, and amongst the pagan Romans, and in Eastern nations it was also practised; so of its antiquity and universality there can be no doubt.

It is a singular fact in the history of castration that for a long time the operation was confined to a class of men, for the most part ignorant in the extreme, who by long practice had acquired considerable skill in the performance of this operation, and even now in not a few instances the services of the unqualified cutter are preferred to those of the supposed to be skilled M.R.C.V.S., a circumstance which I think is to be accounted for by the fact that most of these "gelders" seem to have a natural aptitude, increased by lengthened experience in the handling of unbroken colts, while too frequently the young veterinary surgeon, destitute of practical knowledge, cuts such a figure in his preliminary manipulations that people begin to think, that though he may be able to treat disease, in this operation the "lucky man" is more to be depended upon; and I must certainly say that in my experience I have found that the mortality after castration is less amongst those animals which have been castrated by empirics than those which have been operated on by veterinary surgeons.

The operation of castration in the horse may be said to be one either of necessity or convenience, according to the indications it is called to answer.

Thus, castration is a necessity when it is performed for the purpose of removing certain diseases of the testicles or neighbouring organs, such as Sarcocele, Hydrocele, Abscess of the epididymis, Hernia, etc., or when it is performed for the purpose of improving the temper of a dangerous or cowardly animal.

The operation is one of convenience when it is put in practice with the design of modifying the animal organism, and better fitting it for the exigencies of domesticity. Castration quickly effects marked changes in the character, form, and nutritive functions of those subjects submitted to its effects. The gelding, more especially if the operation has been performed at an early

age, somewhat resembles the female in external conformation, and that the character is very materially altered is certain from the fact that emasculation will frequently convert a sour and savage animal into a good-tempered, generous race-horse. This is well-known to practical men, and the extraordinary improvement effected in the disposition of a horse by the removal of the testicles is frequently proved on our race-courses, when some gelding, which when entire was remarkable for ill-temper and cowardice, gamely struggles home after a severe race, answering every call of his jockey, and enduring severe punishment without flinching.

That castration modifies the nutritive functions is evidenced by the difference we may observe between the flesh of the bull and that of the ox. It favours the development of the cellular and adipose tissues, and though these changes are not so evident in a horse as in some other animals there is no doubt but they occur to a certain extent.

Before proceeding to discuss the various methods of castration it is necessary to be acquainted with the anatomy of the parts involved in the operation, and though you are of course all familiar with it, I will venture to occupy a few minutes in a short description of the testicles, their annexes and envelopes.

The scrotum, situated in the inguinal region, forms a sac divided into two parts by a raphe prolonged from the perineal region. On dissection we find that the scrotum consists of five layers, superposed as follows, viz., the skin, the dartos, an aponuretic layer, the cremaster, the tunica fibrosa vaginalis.

The skin is very thin and covered with fine hairs, and immediately beneath it is the dartos, which is formed of a mixture of organic muscular tissue and elastic fibres, and it contracts under the influence of cold, drawing the scrotum more into the inguinal region; the fibro-cellular layer is very thin, and consists of fibres of the *obliquus internus* prolonged from the lower inguinal ring; the cremaster is a bundle of red muscular fibres which extend from the iliac fascia through the inguinal canal, and is attached to the external face of the tunica fibrosa proper. Though usually described as one of the coverings of the testicle, the cremaster hardly deserves to be so called; the tunica fibrosa proper is derived from the fascia transversalis; it envelopes the testicle and gives off a reflection which closely surrounds that organ, and is known as the tunica vaginalis testis.

The testicle is an organ of oval form. It is free at the bottom of the inguinal canal, but its movement is restricted by its attachment by a peritoneal bond to the posterior border of the canal. At the superior border of the testicle is a sort of vermiform body, known as the epididymis, from which the vas deferens proceeds; the veins of the testicle unite to form two or three tracts, which proceed upwards. The artery, which is derived from the posterior aorta, proceeds downwards in a flexuous course at the anterior part of the cord.

We will now proceed to consider the best age at which to practise the operation, the general and particular conditions most favourable for its execution, and, finally, the manner in which it is safest and most convenient to cast and secure the animal. The horse may be emasculated at almost all periods of his life, from a few days after he is born up to twenty years or more; but the operation is easy to execute and less dangerous in the youthful than the aged animal, and in my opinion no rule can be laid down, as each case should be considered on its merits, the stage of development, shape, breed, and purpose for which the animal is intended being taken into consideration. Speaking generally, I believe that horses intended for light harness or saddle work should be castrated at an earlier period than those intended for heavy draught, but even here we ought to look to the shape and development of the individual. If the forehand is

light, the postponement of the operation for some months will be attended with benefit, and if the animal is ill-developed, delay will also be useful. Youatt advises that horses intended for light work should be operated on when four or five months old ; those of heavier breeds at a year. There can be little doubt but that the danger of the operation is in inverse ratio to the age ; the younger the animal the less the risk ; but in my practice I am most frequently called upon to castrate yearlings and one-and-a-half-year olds, and these ages I consider as generally suitable as any.

It is perhaps because castration is so very commonly done by veterinary surgeons, that proper precautions are not always observed in inquiring into the conditions under which it is to be performed ; and though the reckless practitioner, who is prepared "to cut" a horse at any time, in any weather, and under any circumstances, may succeed in some cases, in some his want of precaution will pretty surely end in the death of his patient.

Before proceeding to operate, the practitioner should take into consideration the state of health of the animal, its freedom from Hernia and other local diseases, the season of the year, the temperature, and the sanitary surroundings.

The best seasons for operating are spring and autumn, while the temperature is moderate. Frosty nights and easterly winds should be avoided. I find that in animals castrated in winter, the wounds heal slowly, and the condition remains poor for a long time, while in those subjects which are operated upon in summer, there is a tendency to gangrene in the wounds, and the flies are also troublesome.

We should if possible avoid operating at a time when Influenza prevails amongst horses, for even if our patient appears in perfect health, it seems to me that the particular state of atmosphere which exists during the prevalence of this enzootic disease, is unfavourable to the recovery of the animal. It is hardly necessary to say that the animal about to be castrated should be in perfect health and fair condition. We should be careful to avoid operating on a horse which is suffering or recovering from Strangles, for I have found that under such circumstances fatal results not unfrequently ensue, or at best enormous swelling of the sheath, phlegmonous abscess of the cord, and great debility result. It is necessary that the instruments and hands should be quite clean, and free from septic germs. I am convinced that want of care in this respect is not unfrequently the cause of Peritonitis and Septicæmia, and if the operator has been engaged in a *post mortem* or particular case, he should allow some days to elapse before castrating. It is also well to see that the casting bed is clean ; it is a too common practice to cast horses on a dung heap, and I attribute the death of at least one animal which occurred with me to this fact ; and some observations made by Mr. Tedbar Hopkins in a paper on "Antisepticity" some time since read by him, go to show the caution which ought to be observed on these points.

Some authors advise a prolonged course of low diet previous to the operation, but this I think is a mistake. If the animal is very fat, a dose or two of physic and a diminished diet may be required for a time, but as a rule, instead of starving colts about to be cut, it will be found useful to allow them a moderate quantity of oats for a week or two prior to the operation, and in case of older horses, in fair hard-fed condition, no particular change of dietary is necessary. Of course colts should be removed from grass at least twelve hours before being thrown down, and horses in stable should be kept fasting for the same period.

The colt having been haltered, a proceeding which should be accomplished as quietly as possible, the cord at one end of a short-handled twitch should be placed on his upper lip, and the other end secured to the halter ; this,

which is Farmer Miles' plan, is better than the usual long stick held by an attendant, as no matter how the animal struggles, the lip is kept tightly compressed without danger to any one. The twitch being thus applied, the operator should cautiously examine the animal, and ascertain if Hernia be present. Having done so, if he decides to proceed, the next step is to cast and secure the animal, and how best to do this is a matter on which a difference of opinion exists. For my own part I invariably use the ordinary patent screw hobbles, and throw the animal on its left side, and when down I put on the cross hobble, on the uppermost limbs, and then, after removing the right hind leg from the hobble by means of a rope passed under the neck, I secure it with the foot near the front of the shoulder, thus exposing the scrotum. I have cast some hundreds of unbroken colts in this way, and I never yet had an accident, and though some of them were very troublesome, I never met one on which it was impossible to secure the hobbles. Some practitioners use a rope made into a noose, which is placed round the neck; the long ends are now run down between the fore legs, and an end having been placed round each hind limb, either above the hock or in the heel, the rope is again passed through the noose, and the animal pulled into a sitting position, rolled over, tail up, and placed on its back. I dislike this method, as I have known of many accidents occurring when it has been put in practice, and the use of a cart rope is unprofessional-looking, though this objection may be met by using Arnold's patent casting hobbles.

Farmer Miles, who, some years ago, came amongst us as a specialist in the art of castration, secures his patient in a highly complex manner. I only saw him cast one horse, and I must say his mode of procedure is not one which I would be inclined to imitate, and I cannot understand how he would be able to get the multifarious ropes he employs on a vicious or unbroken animal. In his method he uses five rope hobbles, with metal D's, two ropes passing from a loop round the neck, a rope for drawing the legs together, a smaller cord for tying the hind legs to each other, and, finally, a "back rope" for keeping the tackle in its place when the animal is down. To throw the horse he first places a looped rope around his neck, the ends of which are then passed between the fore and hind legs, and brought round on the outside, and again through the loop. He then (if the horse is to be thrown on the right side) puts on a hobble, to which a rope is secured on the near fore leg; rope-hobbles with D's are then placed on the other three limbs, and the rope carried through them as usual; having passed through the D on the near hind limb, the rope is passed over to the off fore limb, where it is run through the D of the fifth hobble, placed above the fetlock; the hind legs are then tied together, and the assistants, exercising their strength, the animal of course falls, and is secured by a series of complicated knots; a spreader is now placed between the hind legs to keep them apart, and the preparations are complete. I must confess that personally I do not admire Farmer Miles' system of throwing a horse; his hobbles, in my opinion, are too complicated and troublesome, and with the exception of the use of the spreader I fail to see what improvement there is in his plan.

In cases in which the horse is very vicious, I have found it useful to place over his eyes a leather blind, made for the purpose. With colts, in particular, this is most effectual, and in cases of emergency a sack or coat may be thus utilised.

There are several different modes of performing the operation of castration. Probably, the most ancient is by simple excision, the actual cautery, or by crushing; subsequently, the ligature and clams came into fashion, and now, in addition to these methods, the operation is performed by scraping, by torsion, by the ecraseur, and by bistournage.

To perform the operation with the clams, the instruments necessary are

a sharp, convex-edged knife, two pair of clams, a key for securing them, and some waxed thread. Into a lengthened description of these instruments I need not enter, as you are doubtless all familiar with them.

Castration by the clams may be effected in two ways, either with the testicle uncovered, the old method, or covered—the new proceeding, the essential difference between which consists in the fact that in the last case the fibro-serous tunic is included in the clams.

In order to perform the uncovered operation, which is most commonly practised, the animal should be secured on its left side, and the instrument being placed at hand, the operator places himself at the animal's croup, the knee against the quarter, and proceeds as follows :—

He begins by seizing the testicle which is in the lowest portion, or, if one organ is very much smaller than the other it should be removed first, as the scrotum becomes slippery from the effused blood, and not unfrequently after the removal of the first testis, the patient, by contracting the cremaster, renders it difficult to secure the second. The operator, having decided which organ he will first remove, should grasp it quickly and firmly with the right hand, and he should then take hold of the cord with the left, and by pressing the testicle in an upward direction render the scrotum tense. Sometimes the smallness of the organs, the shortness of the spermatic cords, or the vigorous contractions of the cremaster, render this part of the proceeding difficult, and in such case, both hands should be placed in the inguinal region, so as to make levers of the thumbs and fingers ; if the cremaster remains contracted, it will be well to divert the animal's attention by tapping him on the nose or some such means, and Bouley recommends that if the spasm persists, chloroform should be administered, but I have never had occasion to use it. The scrotum being, as I have said, rendered tense, a bold incision is to be made down on the testicle, when the gland pops out, unless abnormal adhesions should exist, in which case they ought to be torn through with the nail or the back of the knife. The operator should now take the testicle in his right hand, and should with the left fingers completely separate the tissues for some distance up the cord, so that the organ may be entirely disengaged. The testicle being thus isolated, the clams are to be applied above the epididymis, tightened by means of the key, and secured by the waxed thread. In performing the covered operation the incision must be cautiously made through the skin, dartos, and aponuretic layer ; the tunica vaginalis testis should now be carefully dissected back above the epididymis, and the clams applied as before.

The clams must be removed some time after the operation. Some practitioners let them remain on for twenty-four or forty-eight hours, and a few even for three or four days ; but, except in cases where the covered operation has to be performed for Hernia, forty-eight hours will be found sufficient. To remove them, a twitch must be placed on the animal's upper lip, a side line applied if necessary, and the fore limb being held up, the operator, with a scissors, should remove all the dead tissue beneath the clams. He should then cut the waxed thread with the scissors or a small straight bistoury, and separating the clams with his fingers, they drop off. The eschar which has formed between the clams should not be removed, lest hæmorrhage should occur ; but with the finger he should separate all adhesions which may have formed between the cord and the scrotum. Many castrators use some caustic paste in the clams. I consider it unnecessary, as I have found that the pressure produced by the clams is sufficient to produce complete strangulation of the cord.

By simple excision we describe a mode of castration which consists in the division of the spermatic cord by a sharp cutting instrument, without the employment of any artificial means to arrest the consequent hæmorrhage.

This method is seldom practised here, but on the Continent La Fosse has recommended it and performed it with success; but I imagine that few of us will be found here to incur the responsibilities of an accident which may follow this style of operation. To perform it the animal may be cast or he may be secured standing by means of a side line and Rarey strap. A longitudinal incision is then made in the scrotum, right down to the testicle, which is then seized, and by a cut of the bistoury the cord is to be divided transversely above the epididymis. The cord, owing to its natural retractility, is drawn up into the inguinal canal. The other testicle being removed in like manner, the animal is placed in his stable and kept quiet for two or three days.

The immediate effect of this operation is a profuse hæmorrhage, which continues for some time, but usually ceases spontaneously. The quantity and duration of this bleeding varies according to a variety of circumstances, such as the age of the animal, its condition, the size of the arteries, the vital retractility of the vessels, and the repose observed by the patient after the operation. Another cause which influences the quantity of blood lost is the size of the wound in the scrotum, as the accumulation of blood in the inguinal canal, where the coagulum forms, is a direct obstacle to the emission of that fluid, and the smaller the external opening the sooner this clot will form. For myself, I cannot advise this method. I have twice put it in practice, and though the cases ended well, the bleeding rather alarmed me; but La Fosse, Barthelemy, and other French veterinarians have practised this operation with success, and it is worthy of remark that they state that the weak and debilitated animals lose most blood.

By Scraping.—This is a mode of castration which seems to be of Indian origin. It consists in the division of the spermatic cord by scraping it with a blunt-edged knife. It was prominently brought into notice by Messrs. Crundall and Hurford, Army Veterinary Surgeons, who have had large experience of it in India. According to them, the mode of operating is to expose the testicle by the usual incision through its coverings; then seize the organ in the left hand, and with the fingers of the right separate the non-vascular from the vascular portion of the cord. The former may be cut through at once; the latter should be scraped with a blunt-edged knife until it is divided. But little hæmorrhage should follow this operation, and the animal may go to work in about three weeks.

By Torsion.—This method of emasculation consists in the removal of the testicle, entirely denuded of its coverings, by a rotary movement which twists the cord on itself in such a manner that its fibres become elongated and finally ruptured. This method of castration is one of the most ancient, a fact which is sufficiently explained by the simplicity of the manner of operating and the efficacy of the results obtained. It may be performed with the hands alone or with special instruments, and in the latter case those required, as well as a knife, are a clams and torsion forceps. M. Beaufils has invented an improved apparatus which combines the forceps and clams. To perform this operation, the scrotum being incised and the testicle secured in the usual manner, the steel clam is placed on the cord a short distance above the epididymis; the posterior, non-vascular portion of the cord is now to be divided immediately above the clam, great care being taken not to wound the artery. The operator should now give the clams in charge to an assistant, directing him to keep them well pressed against the scrotum. He should then seize in the forceps that part of the cord immediately below the clams, and commence the torsion by a rotatory motion from left to right; this movement should be performed with great slowness and regularity. The tissues of the cord soon become ruptured, the spermatic artery resisting longest, owing to its flexuous course and toughness. It is of the greatest

importance that as little bruised tissue as possible should be left within the scrotum; hence it is sometimes necessary to reapply the forceps after a few turns if the cord should begin to give way at a distance from the clam. It is also necessary that this latter instrument should embrace the cord *very* tightly, otherwise twisting may occur above the clam, and the consecutive inflammation will be greater than it would otherwise be.

Torsion of the spermatic artery alone is an operation which has been performed and highly spoken of by Molyneaux, Richardson, Professor Simonds, and others, who state that it causes little pain and is followed by a prompt cure. To practise it the cord is exposed and a portion of the artery isolated by a vertical incision. The vessel is now seized in an ordinary artery forceps and twisted in the usual manner. In this way the artery being obliterated the functions of the testicle are of course destroyed, and as neither the nerves nor other structures of the cord are either pressed upon or cut through, theoretically the proceeding seems a good one, but I cannot speak of it from experience.

By the Ecraseur.—This method consists of the ablation of the testicle by a particular instrument invented by Chassignac, and recently improved by that smart American Farmer Miles, having for its object the division of the tissues without effusion of blood, and consisting in the application around the tissues to be divided of a metallic chain put in movement by a particular mechanical arrangement. To castrate with the ecraseur the testicle should be exposed, the chain is then to be placed around the cord and tightened up quietly until resistance is experienced, when the motion should become somewhat slower, but with Farmer Miles' instrument it is hardly necessary to observe this precaution.

In this method it will be seen that the cord is divided without loss of blood, a simple wound results, not complicated by crushed tissues or the presence of foreign bodies, abundant suppuration usually follows, and cicatrization occurs quickly. One of the objections formerly made to this mode, viz, the length of time occupied in performing it, owing to the slowness necessary to proceed screwing up the ecraseur, is done away with by Farmer Miles' instrument, as it may be screwed up rapidly and yet but little hæmorrhage will usually result.

By the Actual Cautery.—In this mode a hot iron is employed as a hæmostatic, the section of the cord being made by a blunt-edged iron heated to redness. This is perhaps one of the oldest ways of castration, and was generally employed in the United Kingdom until the clams came in fashion; but even now it is used to a considerable extent. The special instrument required are a clam, such as is used for torsion, and an iron of special form (such as this). The clams being applied on the cord, the posterior portion is to be divided with the knife as in torsion, and the vascular part slowly divided immediately below the clam with the iron, which should not be too hot. Resin is sometimes used when searing the cord, but I think it is unnecessary.

By Ligature.—This consists in binding, by a flexible cord, the whole or portion of the spermatic cord so as to interrupt the circulation in the testicle and prevent hæmorrhage.

In castration by the ligature the only instrument required is a knife, a needle, and a strong silk or cat-gut thread, and we may include in the ligature either the scrotum and the cord itself, or, as in the covered operation, the vas deferens or the artery alone.

In the first case the scrotum above the testicles is secured in a tight ligature, which is left on until spontaneous amputation of the parts below it occurs. This mode is seldom used on the horse. In ligaturing the exposed cord the string is tightly applied around it above the epididymis, and

it will be found a good plan to place a second ligature above the first, which should be applied by passing a curved needle armed with a double thread through the centre of the cord; the ends of the thread are then separated and tied, each part including one half of the cord.

Ligature of the vas deferens is sometimes had recourse to from the idea that the animal will preserve his vigour and energy, though the power of generation will be destroyed,—a doubtful advantage to say the best of it.

In practising castration by ligature of the artery alone, it is necessary to divide the posterior part of the cord above the epididymis, the action of the cremaster is thus annulled. A longitudinal incision should now be made in the structures surrounding the artery, and that vessel being isolated an aneurism needle carrying a cat-gut ligature is passed under it from before backwards, both ends of the thread are now to be brought back and tied so as to include *all* the flexions of the artery. Caution on this point is necessary, as if the ligature be only applied to one of the ascending circumvolutions of the vessel, and it be afterwards divided below this, bleeding will occur; in fact, the artery might as well not have been tied at all.

Crushing the testicles is sometimes resorted to, particularly by the Arabs, and is performed simply by placing the testicles and scrotum between two resisting bodies and applying strong pressure, which leads to disorganization of the glands.

Under the term "Bistournage" the French describe an operation which consists in the subcutaneous torsion of the spermatic cord, so as to obtain complete obliteration of the vessels, followed of course by atrophy of the testicles. The proceeding is one which requires a good deal of practice and dexterity, and as I have never performed it I will not attempt to describe it.

The animal being now operated upon, the next matter to decide is how to treat him. He should not, of course, be exposed to rain or cold winds, but if the weather is at all favourable, even the day after castration, it will be well to permit young animals to have some hours at grass daily; and in cases where this is impracticable, exercise should be given. For some days the diet should be rather low, to diminish the feverish symptoms; and should the scrotal swelling continue very large, it will be prudent to open the incisions with the finger, but care should be taken not to interfere with the adhesions between the cord and the canal. Some animals have a propensity to interfere with the scrotum with the teeth, and on those the cradles should be placed. With Farmer Miles's system, the animal may resume work in a day or two; and even when operated on by other modes, slow work may be advantageous in a week or ten days.

Having briefly mentioned the different modes of emasculating the horse, it will be proper to consider the various phenomena which succeed the operation, and in doing so it is necessary to distinguish between those which follow when the coverings are not incised, and those which supervene when the envelopes are divided. The symptoms apparent in the first case are of slight practical importance, but in the second instance there remains an open wound of a complex nature from the number of tissues divided, and in which various phenomena appear either during, or immediately after, the operation, or at some time more or less distant. We will term the first class immediate, the other consecutive or secondary. Independent of the normal symptoms which always succeed the operation, but in different degrees, according to circumstances, there are other symptoms which point to certain complications which sometimes occur, and these merit special consideration.

Amongst the "immediate phenomena" we may class pain, difficulty of movement, hæmorrhage, serous engorgement of the wound, and the introduction of air into the abdominal cavity. Pain is, of course, an inevitable consequence of the operation, however it may be performed. It varies in

intensity, according to the method used, but it is, nevertheless, difficult to say what system of operation is least painful, as it seems to me that the temperament of the subject and the dexterity of the operator have a great deal to do with the matter; but I am inclined to think that the clams do not cause so much pain as is popularly supposed, as the vigorous pressure exercised by them should destroy all sensation in a short time, while in the more surgical-looking torsion a small portion of bruised and painful tissue must remain at the end of the cord; but when the ecraseur is used this objection is done away with to a great degree, and the same remark applies to ligature of the artery. Difficulty of movement is also a frequent consequence of the operation, but this depends to a great extent on the susceptibility of the animal to pain, and disappears in a day or two, unless some accident has occurred.

The introduction of air into the abdominal cavity frequently follows castration; sometimes when the animal is released from the hobbles the air is heard to rush up the inguinal canal with a gurgling noise. For some time this was looked upon as a serious affair, likely to be followed by peritonitis, but as it occurs in a large number of cases without any such result the alarm seems groundless.

The secondary phenomena are those which accompany the development of the inflammatory stage following the operation. They comprise, the fever of re-action, inflammation of the cord and the scrotum, and the cicatrization of the wound.

The fever of re-action (or traumatic fever) succeeds castration just as it would follow any other lesion. Preceding suppuration, it occurs on the second or third day, and is characterised by diminution or loss of appetite, constipation, respiration and pulse quickened, membranes injected, etc. These symptoms vary in intensity according to the breed and constitution of the animal and the mode of operation. The fever will be slight and of short duration if the animal is underbred and of low sensibility, and if the operation has been quickly done; and, on the contrary, it will be more intense and continue longer in well-bred horses of nervous temperament which have suffered much during the operation. In ordinary cases this fever lasts for three or four days, and is terminated by the establishment of suppuration in the wound, the appetite returns, the animal becomes lively, and the health is re-established. In any case in which the traumatic fever has not disappeared about the twelth day danger, is to be apprehended.

Inflammation of the cord and the scrotum is also a necessary consequence of the traumatic lesion resulting from this operation, and it also varies in extent according to circumstances, particularly according to the operatory proceeding used. Thus, in the covered operation by the ligature or the clams, the cord is connected by its extremity to the tunic vaginalis, whilst in all other methods the cord being not so retained retracts towards the superior head of the canal, drawing with it the clams, ligature, areolar or bruised tissue, as the case may be. In these cases the intensity of the inflammation varies according to the retraction of the cord, the size of the foreign body, etc., but as there is always a complex wound which cannot close by the first intention, there is necessarily a stage of suppurative inflammation, preceded by an engorgement, more or less considerable, of the parts affected.

This engorgement, the first indication of the inflammatory period, is common to the cord and its envelopes. In the cord it is first caused by the interruption to the circulation due to the formation of blood-clots in the spermatic vein and artery, which subsequently leads to the obliteration of hose vessels. Above the point where the circulation has been interrupted ither by the clams, the ligature, the cautery, or any other way, the areolar

tissue of cord becomes infiltrated with serosity, and this infiltration so increases the size of the cord that it completely fills the inquinal canal. The liquids which distend the cord soon begin to be reabsorbed, and it diminishes in size, but preserves a certain amount of hardness due to the blood-clots which subsequently become organised.

In the scrotum, also, the engorgement commences to appear about the second day. It is due to the serous infiltration of the areolar tissue. The enlargement feels hot and painful, and frequently extends along the belly to the sheath, where its size is sometimes considerable; but as long as it remains confined to the inferior face of the abdominal walls, though it be very large, and advance along the belly even as far as the chest, it is not a serious matter, as, when the scrotal swelling disappears, the œdema of the belly is also gradually re-absorbed. The matter, however, is very serious when the swelling takes an upward direction on the sides of the abdomen, and then also the thighs become engorged. Under such circumstances gangrene is to be feared, a grave complication, to which I will again refer, and to prevent which is of the greatest importance. This inflammatory engorgement, which is particularly large in animals of soft or lymphatic temperament, or in those subjects which are exhausted by illness or fatigue, varies according to the method in which the operation was performed. Thus it is always very great when the ligature is used around the whole of the cord, and, in my experience, very slight when torsion has been properly performed.

The suppuration consecutive to the inflammatory engorgement begins by a slight oozing of sero-purulent fluid, which bathes the lips of the wound, becoming gradually more thick and abundant, finally assuming the character of true pus. This suppuration may extend more or less deeply. Thus when the clams have been used, which prevent the cord being deeply retracted, the purulent secretion being limited to the extremity of the cord and the borders of the incision is somewhat superficial; but when the cord is drawn up, as occurs after castration by torsion, by cautery, etc., the suppuration is more deeply seated. The duration and quantity of the suppuration is also influenced by the cleanness of the wound and the state of the surrounding structures. It is generally very profuse after the covered operation, as the clams being placed above the fibrous tissue a large cellular surface is exposed. The duration of the suppuration is also influenced by the presence of foreign bodies, such as the eschar, ligature, etc., in the wound; and the more quickly they are eliminated, the sooner will the secretion diminish.

The manner in which the cicatrization of castration wounds occurs is due to the nature of the lesion; it is accomplished by adhesive inflammation in the upper part of cord, and suppurative inflammation in the lower part and the scrotum. The adhesive reunion in the upper part of the cord occurs quickly. It commences some hours after the operation, and is favoured by the intimate contact which the swelling establishes between the external surface of this organ and serous membrane, which exudes a plastic lymph, by means of which an intimate union is effected between the stump of the cord and parutal lining of the canal, constituting true union by the first intention, and is complete the second day. After a time the union between the cord and the serous tissue becomes more intimate, and the cord itself ultimately becomes transformed into a sort of fibrous ligament.

To secure this adhesion by the first intention, it is essential that the inflammation of the parts should be moderate. If it is very intense the exudation loses its organisable properties, changes its nature, and becoming pus-like, cannot serve as a means of union between the cord and the canal.

The cord then remains isolated on all sides from the surrounding structures, and being the seat of an abnormal irritation, it becomes of a great size ; the granulations at its extremity do not adhere to the neighbouring tissues, but become hypertrophied, and give rise to the pathological condition known as Champignon.

At the lower part of the cord and the lips of the wound, when matters progress well, granulations are developed which secrete pus, and gradually contract and heal up.

No matter how well castration has been performed, there are certain unfortunate accidents which may supervene ; and amongst these I may mention Colic, Hæmorrhage, Gangrene, Amaurosis, Excessive Scrotal Swelling, Abscess, Champignon, Hernia, Peritonitis, and Tetanus.

Colicky symptoms are most common when the clams have been used, and are probably indicative of pain caused by them. As a rule, slight exercise is sufficient treatment, or, if the pain remain, unabated fomentations may be used, but most frequently no treatment need be adopted.

Hæmorrhage may be either primary or secondary. In the former case it is due to the insufficiency of the hæmostatic means employed, or to the operation being badly performed, or it may occur from the artery of the cord or vessels of the scrotum being unusually large, or, as mentioned by Mr. McGillivray, from laceration of a spermatic artery above the point of section, either by excessive traction or wound with the knife.

Secondary hæmorrhage is chiefly to be feared when the clams are used, and are not put on sufficiently tight, or have been interfered with. In such case, when they are removed, troublesome bleeding may occur.

The danger of hæmorrhage varies according to whether it is primary or secondary, and in the first case according to the form of operation. Secondary bleeding is most to be feared, as the retractility of the vessels is impaired by the inflammation. For treatment, the effect of cold affusions should first be tried, combined with external pressure by the hands ; and, should this not succeed, a rug wet with cold water should be placed across the loins, and a plug of fine tow steeped in water or solution of perchloride of iron placed in the wound, and even secured by sutures, if this is necessary. (This should be removed within twelve hours.)

Should the bleeding still continue, it will be necessary to cast the animal, discover the bleeding point, and seal it up by actual cautery or the ligature. This, of course, is a last resort, and it need very seldom be done, as even when the flow of blood seems very great, in most instances it will cease on the employment of the simple means above detailed.

Amaurosis has been observed to occur after castration, and generally occurs when excessive hæmorrhage has supervened. Spontaneous recovery may take place, but the prognosis is grave and treatment of little use, though tonics may be admissible.

Œdematous swelling of the scrotum is always to be expected to some extent, but even when very large it need not cause alarm. A few punctures with a lancet, exercise, hot fomentations, and perhaps a little diuretic medicine will generally be found sufficient.

Gangrene is a very serious complication, which not unfrequently succeeds castration. It is particularly common in warm, damp weather, and in weak, bad-constitutioned animals, and may be caused by dirty instruments or hands. The symptoms of its invasion are increased swelling of the scrotum and sheath, and the engorgement has a tendency to take an upward direction towards the loins, the thighs also becoming affected. This swelling sometimes crepitates, and the animal lies a good deal and gives up feeding. The secretion of pus is also suspended, and in its place a sero-sanguinolent fluid, exhaling a fœtid and characteristic odour, is poured out. Cauteriza-

tion of the wounds and the injection of antiseptic lotions is the only chance, but unfortunately the termination is almost invariably fatal.

Abscess of the scrotum occasionally occurs when the wounds heal too quickly, but as a rule it is not a very serious matter, the treatment being to open the incisions with the finger or to puncture the abscess with a lancet. Sometimes the abscess forms in the region of the loin, and it then forms much more slowly, not appearing for three or four weeks or more after the operation. A slight swelling is first noticed in the groin; the animal becomes lame and shows acute pain, and as the swelling increases he cannot lie down. After some time on manipulation, the fluctuation characteristic of an abscess may be detected. Hot fomentations, and puncture when the abscess is matured, is the appropriate treatment.

Champignon is the term applied to a sort of tumour or cauliflower-looking growth, which appears at the cut extremity of the spermatic cord, or in the thickness of that organ. It may be limited to the end of the cord, and form sometimes a very large tumour, and it is then said to be extra-scrotal, or it may be within the sac, and it is then said to be subcutaneous, and is termed extra-inguinal, intra-inguinal, or intra-abdominal, according to the portion of the cord involved.

The etiology of champignon is involved in obscurity in many cases. Speaking generally, it may be said it proceeds from an excess of inflammation, due either to the mode in which the operation was performed, or from circumstances which then existed or occurred subsequently. Thus, for example, it is stated that very violent traction exercised on the cord whilst operating favours the formation of champignon, and it is also asserted that inconsiderate handling during the period of cicatrization, notably the repeated introduction of the fingers into the inguinal canal, destroying the adhesions between the cord and the serous lining of the inguinal canal, augment the inflammation, and give rise to one of the conditions likely to cause champignon. It may also occur without any apparent cause; the individual idiosyncrasy may have a part in its development. It is said to be most frequent in cold weather, and the insufficient tightening of the clams, or the omission of separating the end of spermatic cord from the scrotal wound when removing the clams are also set down as causes. Excessive exercise during the healing of the wounds is also supposed to influence its growth, and humid and unhealthy stables are credited with some of the ill effects.

Champignon is made up of an embryonic or inflammatory tissue, pierced by a number of vessels of new formation. It is formed by the proliferation of the plasmatic elements of the conjunctive tissue, which have undergone a retrograde process, causing tumefaction of the cord, and ultimately the formation of an abscess in the middle of that organ. The walls of this abscess soften; numerous and intimate adhesions occur between the cord and the canal, owing to the vascularity of the inflamed parts. When the champignon is situated below the scrotum, it forms a rounded, reddish, pediculated tumour.

Extra-scrotal champignon is developed at the cut extremity of the spermatic cord, where it forms a granulatory tumour of a bright red colour, in size varying from a hazel nut to a man's head, or even larger, and Bouley has mentioned a case in which the tumour descended to the hocks. The large size which the tumour attains indicates its power of growth and its nutritive activity. When outside the scrotum, champignon is not generally a very serious affair, for it can be easily removed on account of the lesion being limited to the divided part of the spermatic cord. Occasionally the tumour acquires such considerable volume that by its weight it exercises painful traction on the cord. In such an exceptional case the animal moves with

difficulty, the posterior parts seeming weak, whilst the prolonged and abundant suppuration of which the champignon is the seat debilitate the anima Nevertheless, in the large majority of cases extra-scrotal champignon need not give rise to general symptoms, as it may be removed before becoming large enough to do so. In subcutaneous champignon the symptoms depend upon the extent of the cord involved. At the beginning an œdematous tumefaction in the region of the scrotum, with a certain difficulty in the movement of the hind limbs, and traumatic fever are observed.

If the induration of the cord is below the inguinal ring (extra-inguinal), on exploring the testicular region, the cord will be found increased in size, irregularly pear-shaped, hard, somewhat painful, and adhering to its envelopes; above this tumour the cord will be found soft and free from tumefaction. Thus limited, the champignon may become chronic, and the animal work for years (I myself know a horse so affected for fourteen years past), but sometimes lameness may result from induration of the lymphatic ganglions of the groin. In some cases this form disappears spontaneously, an abscess forming in the locality, and little by little the induration disappears.

When the induration invades that portion of the cord contained in the inguinal canal the power of locomotion is affected. The limb on the side affected is held abducted during the walk, fistulas exist in the region of the scrotum, which is engorged, the traumatic fever is violent, the animal lies constantly, and the appetite is lost. When the enlargement ceases below the superior inguinal ring, and is definitely formed, then the swelling of the scrotum decreases, and the general symptoms become amended. To ascertain the height which the tumour has attained rectal exploration is necessary.

In case the tumefaction extends the whole length of the cord, the tumour is said to be "intra-abdominal, and is a very grave matter. The animal suffers great pain, and frequently succumbs to the exhaustion produced by the irritative fever and the profuse suppuration which occurs. Not unfrequently the abscess which forms in the centre of the cord discharges its contents into the abdominal cavity and causes speedy death. In other cases the pus finds an external outlet, and if the animal be vigorous and healthy, he may resist the exhausting effects of the suppuration, which persists until all the altered parts of the cord are eliminated. Sometimes purulent infection occurs, metastatic abscesses form (in the lungs more particularly), and death closes the scene.

In the first stage before the tumour of the cord becomes distinct, surgical measures should not be put in force; emollient lotions and fomentations with purgatives and drenches as derivatives should be used. When this does not succeed, thermo-puncture may be tried, the scrotal enlargement being pierced with the hot pointed iron; under this treatment resolution sometimes is obtained; but if not, a surgical operation is necessary.

The surgical methods for the treatment of champignon are four in number, viz., the clams, the ligature, ecraseur, and cauterisation.

The clams, which are suitable only for extra-scrotal and inguinal cases, should be placed well above the tumour on the healthy cord, and to effect this, all adhesions to the tumour should be torn through with the fingers, or the handle of a scalpel; a rather strong clams should be used, and they should remain on for three days, but one disadvantage of their use is that they sometimes cause the formation of a new champignon.

When the induration extends to the upper inguinal ring, the ligature must be employed, and if very high up, a porte-necuel should be used. The cord being separated as before, the ligature should be tightly tied above the diseased part. The elastic ligature has been used with much success. The ecraseur is perhaps the best method of removing the champignon; it is ap-

plied in the same manner as the ligature, and the screw being gently tightened, the structures are soon cut through. In practising cauterization, the length of the iron must be in proportion to the depth of the tumour. Being brought to a white heat, the iron is passed into the diseased mass several times, and if the tumour be very large, it is well to excise some of it with a bistoury, and check the hæmorrhage with the iron. This operation is particularly applicable when the champignon is intra-abdominal, as the abscess may be reached, and the pus being discharged externally, healthy action is set up, and a cure results.

Fistulæ in the scrotum occasionally succeed castration, and are to be treated either by dividing the masses with a bistoury, applying caustics to them, or using the cautery, and each of these means has its advocates. I prefer the knife myself.

Inguinal Hernia is an accident which may occur either during or immediately after castration, or some hours later, or when the clams are removed, and consists in the descent of the intestine into the inquinal canal. Of course, the indication is to return it, and for this purpose the animal should be placed on his back and the taxis employed. When the intestine is in the abdomen, a few points of suture must be run through the scrotum, which quickly causes an engorgement generally sufficient to prevent the re-descent of the bowel.

Of Tetanus and Peritonitis I think it unnecessary to say anything, except that they sometimes occur as a result of castration.

It now remains for me to say a few words on the relative value of the various operations I have described, and to point out those which I consider the best, having regard to the facility of the proceeding, the after treatment necessary, and the chance of immunity from the various accidents which follow castration.

All the methods have their advantages and their inconveniences, and almost every operator has his prejudices, each one preferring the way he himself practises. It is impossible from statistics to determine the relative mortality of the different means.

The clams offer the double advantage of closing the inguinal ring, and favouring adhesion of the cord to the canal, but they are supposed to cause severe pain, they irritate the lips of the wound, they require a second operation for their removal, and they may be torn off by the teeth. As to the excessive pain, that at least is problematical, for it is a singular fact that a man when castrated by the ligature, though he feels severe pain when it is first applied, soon loses sensation in the part, and would this not be so in the horse?

Castration by the cautery is easy to perform, produces complete emasculation, and does not require a second operation; but it is cruel-looking and somewhat tedious, and there is sometimes a difficulty in arresting the hæmorrhage.*

Torsion is the method which for some years I chiefly employed myself, and I have lost but one case thus operated on. It is easy to execute, the subsequent inflammation is not generally very great, no second operation is necessary, and the wound heals quickly, and this also appears to be the opinion of that eminent authority, Professor Williams.

Ligature of the whole cord is seldom performed, and ligature of the artery alone with silk has not been attended with good results, the fatality being very high; but torsion of the artery is highly spoken of by Professor Simonds and others, and during the past season I have castrated twenty-eight horses, including two aged stallions, by ligaturing the artery with carbolised catgut

* Seldom, unless the iron is used too hot.—J. S.

with the most satisfactory results, the animals in every instance doing exceedingly well, recovering quickly, and seeming to suffer little. This mode of operation is decidedly the most scientific and surgical, and is one which I would like to see more extensively practised.

Division of the cord by scraping is not much used in these countries, but is very general in India, and even in that hot climate Mr. Hurford says it is very free from ill results. Formerly castration by Chassignac's ecraseur was a tedious and painful business, and there was some danger of a hernia occurring from the prolonged struggles of the animal while the instrument was being screwed up. Farmer Miles' invention, or improvement, has altered this to a considerable extent, and the operation can now be performed tolerably quickly, without fear of hæmorrhage. In this method there is neither a foreign body nor a piece of dead tissue left in the wound, and the horse may go to work the day after he is castrated, the only precaution required being to keep the wound open, by separating the lips of it with the fingers. For my own part I have thus operated with success, and I intend to extend my experience of it next year; but at present I am disposed to place most reliance on ligaturing the artery with carbolised catgut, which soon becomes incorporated with the tissues, and unlike silk and other such substances, does not act as a foreign body in the wound.

On drawing this lengthy paper to a close I trust, gentlemen, that if I have not said anything new, I have, at all events, afforded you the grounds for a discussion. Of course, in a paper on Castration, nothing very original might be expected, and as this is more a compilation than an essay, I trust the debate may atone for its shortcomings. You will observe that I have not said anything as to the castration of cryptorchoid horses, and I trust that that portion of the subject will be dealt with by some of you.

Thanking you for the patience you have exercised in listening to my essay, I leave the matter in your hands, in the hope of obtaining some information from the results of your experiences.

The discussion which followed Mr. Simcocks' paper was of an exceedingly interesting character, in which the President, Messrs. W. Pallin, J. Malcolm, L. Hunter, J. Freeman, J. Preston, J. Bell, the Secretary, and others, took part. Mr. L. Hunter, of Dublin, gave a very exhaustive description of his method of casting and securing vicious horses for castration, and detailed the case of a vicious race-horse at the Curragh, in which he had succeeded by this method in effecting this purpose, after having failed, during a period of four hours, to cast and secure the animal by the ordinary methods, and he concluded his observations by describing a case of effusion into the pericardial sac, which he suffered in his own person, as a result of his violent contention with the animal spoken of.*

The thanks of the meeting to Mr. Simcocks for his able paper were proposed by Mr. Hunter, and seconded by the Secretary, and were carried unanimously, and the essayist having acknowledged the resolution, the date of the next meeting was arranged, and a vote of thanks to the President concluded a very interesting and successful meeting.

J. J. SPERRING, F.R.C.V.S., *Hon. Sec.*

[The above report did not come to hand in time for publication in our last issue.—ED. V. J.]

* It appears that Mr. Hunter, whilst suffering from this condition, lay for forty-eight hours in a perfectly insensible state, there being a complete absence of pulse, heart sound, or appreciable respiration—a pathological condition which was, and is still, considered by his medical attendants to be unique in the records of medicine.

SCOTTISH CENTRAL VETERINARY MEDICAL ASSOCIATION.

THE fourth quarterly meeting of the above association was held in the Salutation Hotel, Perth, on 6th October. The President, Andrew Spreull, Esq., F.R.C.V.S., was in the chair, and the following members were present, viz. :—Messrs. Johnston, Perth ; Philp, St. Andrews ; Fingzies, Lochgelly ; Hunter, Dundee ; Ritchie, Forfar ; Constable, Inchture ; Black, Lochee ; and Clark, Secretary, Coupar Augus ; Messrs. Keay, St. Martins, and Dr. Robertson, Errol, being present as visitors. Apologies for absence were received from Messrs. Rutherford, Edinburgh ; Hampton, Arbroath ; Bissett, Brechin ; Reid, Auchtermuchty ; and Panton, Blairgowrie.

The minutes of the previous meeting having been read and confirmed,

Mr. Wm. Panton, Blairgowrie, was unanimously elected a member. Mr. Keay, St. Martins, was nominated for membership.

The CHAIRMAN brought before the meeting the subject of the Fleming Testimonial, asking the voice of the meeting as to whether it was desirable to subscribe as an association, or it be left to individual members to subscribe as they considered fit. This last proposition was received with most favour, and agreed to. Letters were read from Mr. Pottie, Paisley ; Mr. Hill, Glasgow ; and Mr. Rutherford, Edinburgh ; anent united meeting of the three Scottish associations. It was intimated that the first meeting would be held in Glasgow on the 24th inst., and urging strongly that as large a muster as possible be present.

This being the last quarterly meeting of the year, Mr. Johnston, Perth, proposed that the present chairman, secretary, and treasurer should hold office for another year ; seconded by Mr. Ritchie, Forfar.

Mr. PHILP, St. Andrews, proposed that Mr. Bissett, Brechin, be elected a vice-president in the room of Mr. Robertson, Madduty, who declined ; and that Mr. Reid, Auchtermuchty, and Mr. Ritchie, Forfar, continue vice-presidents as formerly ; seconded by Mr. CONSTABLE.

The CHAIRMAN then proposed that, owing to the sad and melancholy death of Mr. J. B. MacGregor, Crieff, an esteemed member of this association, a letter of condolence be forwarded to his mother, and that a copy of said letter be entered in the minutes of the meeting.

The meeting then proceeded to continue the discussion on Mr. Constable's paper, read at last meeting, subject, " Strangles in Horses, with Notes of a Case affecting the Human Subject." Dr. Robertson, of Errol, medical attendant in this unique case, was kindly present to give explanations.

Mr. JOHNSTON was next called upon to read his paper on "Counter-irritation," which gave rise to a lively discussion ; so much so, that it was resolved to continue the discussion at the next meeting.

After votes of thanks being accorded to Mr. Johnston, Dr. Robertson and the Chairman, the meeting was brought to a close.

J. CLARK, *Hon. Sec.*

Coupar Angus.

THE ROYAL VETERINARY COLLEGE.

THE winter session of the Royal Veterinary College commenced on October 2nd, when there was a very large attendance of members of the profession, and a full muster of students present to inaugurate the event, and to hear the introductory address, which was delivered this year by Professor Axe. Major-General Burnaby, M.P., occupied the chair. The address, which was listened to with marked attention and frequently received with applause was as follows :—

"Mr. Chairman and Gentlemen,—We are met together to-day, in accordance with prescribed custom, to inaugurate the commencement of another academical year.

My colleagues have deputed to me the proud privilege and pleasure of introducing you, on this the first day of our session, to the scholastic duties on which you are about to enter, and in their name and in the name of the governing body of the College, I bid each and every one of you welcome to our *alma mater*.

The opening of a new medical session is, to all who appreciate aright the relations and responsibilities of your teachers and yourselves, an imposing, nay a solemn and momentous occasion. To many whom I see around me it is a landmark of the far-distant past, the opening chapter in the history of many a hard-fought battle of life, prefaced by the gilded dreams of boyhood and the romance of youth. To your teachers it is the chronicler of time, the hand that tells of fleeting years, and points to duties past and others yet begun.

For them it is an hour of supreme anxiety, pleasure, and pride. Anxiety lest we who love our duty and our profession should fail to inspire an equal love of them in you; pleasure, because of the confidence and encouragement we derive in the presence of so many of our old and good friends, former students of our schools; and pride in the honourable presence of distinguished members of the governing body, whose never-ceasing devotion to our cause has made and maintained the College of St. Pancras one of the foremost veterinary school in Europe. My purpose, however, is not with the relative merits of schools. It is more especially to those who are with us to-day for the first time, and who have resolved to make veterinary science their future study, that I desire to tender some words of counsel and advice; and, firstly, I would congratulate you in all sincerity on your choice of our profession. In electing to become the servant and healer of the sick dumb, you have displayed a noble sentiment at the outset of your career, a wholesome promise of humane enthusiasm, which, if maintained to the end, will bring a reward more precious than wealth, and more abiding than honours of place.

The calling you are seeking to follow ranks with the most exalted and sacred of man's appointments, and needs for its successful pursuit the highest powers of the mind. That calling is the profession of veterinary medicine. By medicine we understand all those various means and methods of application which the resources of science afford us for the preservation of health and the cure of disease. It is the science of health, of life, and of death. How vast then, how comprehensive, how seemingly appalling will appear the domain of your chosen study! Do not, however, let the magnitude of the task before you cause one halting step, one sentiment of fear, but hopeful and resolute, relying on the spirit by which alone greatness is achieved, steadily and intently pursue it undaunted to the end.

In asking you to put forth these high and noble qualities in a high and noble cause, I do not despair of success in any one of you who chooses to let "I will" wait upon "I can." If there be among you one possessing the intellectual qualifications which are guaranteed by your presence here to-day, who entertains doubt and misgiving as to the issue of your endeavours in this, the first essay of your life's work, to him I say, "Take heart!" Bring with you but courage and resolution, fortified by a sense of duty, and directed by the spirit of science, and you may, if you will, not only be successful students here, but men of real worth hereafter. Remember, success in all things depends, not so much on "the power to achieve, as the will to labour." Many a shining light has been eclipsed by the want of that priceless quality—will, force of purpose—call it what you may.

As you proceed along your journey it will soon be obvious that medicine is a progressive science, and must ever continue so until nature has yielded up to the biologist and the physicist her last secret in all that concerns life. For the votary of medicine, then, there is no hope of finality. You will, therefore, please only regard your career here as the stepping-stone to a life of learning, a perpetual studentship, lured on and fostered by the ever-increasing light which your labours will from day to day reveal to you in the boundless and inexhaustible field of science. I need hardly assure you, that medicine, be it human or comparative, whether applied to man or to the lowest of God's creatures, has the same principles underlying it, and requires for its successful pursuit mental qualities and scientific attainments as high and as far-reaching in the one case as in the other. You need not, therefore, be under any apprehension lest the intellectual order of your mission should suffer by comparison with that of the sister profession. The scientific pathology of to-day owes its brightest chapters, its greatest truths, and its most beneficent teaching to the study of morbid processes in the lower animals; and with the most profound respect for the views of those who formulate the curricula of our medical schools, I make bold to think that comparative pathology is indispensable as an element in the evolution of human medicine, and must, sooner or later, became an essential part of the education of all who aspire to the healing art. Human and veterinary medicine are bound together by the strongest natural affinities, and their intimate science relations demand that those who seek to comprehend the one must have regard to the teaching of the other. Yes! side by side, hand in hand, step by step, must be the order in which the two faculties must, sooner or later, resolve to proceed—waiting upon and fostering each other's aims and efforts, sharing each other's honours and labours, and emulating each other's excellencies.

In such mutual co-operation and support as will enlarge the foundation on which medical knowledge rests, appears to me to reside the future hope of medicine, both human and comparative. This lofty and commanding aspect of our calling is no mere picture. The guardianship of the health of man against the attacks of disease falls fairly within our province, and for the sake of suffering humanity I hope it will ere long be even more justly acknowledged and sanctioned by the State.

Without the aid of veterinary science the department of State medicine in this country must ever continue what it is at the present time, an unreliable and inefficient organisation. The very large number of diseases now known to be transmissible from the lower animals to man renders a knowledge of comparative pathology indispensable to the efficiency of our sanitary service. It may not be soon, but the time must come, when the authority and active assistance of veterinary science will become a recognised essential in the general administration of sanitary police. Educated as veterinary surgeons now are, trained to observe, to record, to reason, and to act, familiar alike with the habits and instincts of animals, and the life conditions of man, they have become a source of scientific strength which no amount of prejudice can long exclude from participating in the defence of public health.

With such destructive diseases as Tuberculosis, Rabies, Anthrax, and Glanders constantly in our midst, one and all transmissible to man by the most simple as well as the most subtle of means, each contesting and defeating all the resources of therapeutics and hygiene, bringing death, desolation, and poverty into our homes. In the face of these things, I say, there is surely reason in suggesting that those whose special training has fitted them to detect these virulent diseases, and to devise means for their extinction in the lower animals, represent a power and an indispensable element in the sanitary service of the country.

This, gentlemen, is the highest and most ennobling view of your calling, and one which should ever be before you. The pathological and sanitary relations of man and the lower animals is a subject of the most vital and pressing importance, and offers to our profession a wide field for the exercise of its powers for the good of mankind. It comprehends, among other equally important questions, the natural history of parasites in relation to parasitic diseases, and the propagation of Tuberculosis by the consumption of flesh and milk. In the latter connection you will naturally be led to consider in what measure the great prevalence of this disease, both in man and animals, may pertain to the breeder of cattle. I do not hesitate to affirm that the time has already arrived when some restraint should be put upon the present unbridled use of tuberculous oxen for breeding purposes, as well as for a more energetic interference with the disposal of tuberculous flesh.

Both observation and experiment clearly point to our present reckless system of cattle breeding as a menace to public health, and call for legislative interference and measures of control. While, however, you may share with the sister profession the dignity of protecting and raising the health standard of the people, the chief concern and mission of your life will be devoted to our herds and flocks, our studs and kennels—to those noble creatures, indeed, whom man has domesticated and rendered subservient to his various wants.

You are about to undertake one of the most difficult, the most comprehensive, and the most embarrassing of all the pursuits of science ; and at the outset of your journey it is necessary that you should seriously ask yourself whether you possess the necessary qualifications for such an enterprise. That your general education is fairly good is admitted by your presence here to-day ; the amount and extent of your general knowledge has been duly gauged, and you have been found to possess a certain amount of a certain kind of subjective information. Your passport into this school is based chiefly on your powers of memory, on your capacity to store up and retain a number of facts gathered together in the course of what is termed a liberal education. Now, although this faculty is of the highest importance as a factor in the intellectual campaign in which you are about to engage, I must seriously caution you against placing too much reliance upon it for the success of your medical career. The manner and nature of your prospective studies will be found altogether different from that of your past scholastic training. Your teachers are "no longer schoolmasters, to set daily lessons for you to puzzle out at home and commit to memory for mere repetition." Nor will all the advantages of a well-stocked library, supplemented by the most vigorous devotion to study alone, avail you in the pursuit of medical knowledge. The spirit and method of your future action must be framed on lines widely different from those laid down for the acquisition of a general education. Your attention will now be strictly devoted to the consideration of natural science, to an inquiry into all that concerns life, health, disease, and death. You will be brought face to face with nature, and it will be your privilege to interpret her, and the aim of your mission to understand her ways. In this connection your scholastic education, and especially your knowledge of mathematics and physics, will prove of infinite advantage, serving as they will to unveil those fundamental laws which govern the world of inorganic nature, and to explain many natural phenomena which would be otherwise unintelligible.

Your knowledge of Greek and Latin will enable you to disperse the obscurity of medical terminology, and your acquaintance with modern language is equally valuable as a means of extending your communion and reading beyond the people and literature of your own country ; but let me assure you that valuable as all this may be, it is but a fraction of the intellectual

means necessary to the accomplishment of the great task before you, viz., a knowledge of the science and art of medicine.

From the arena of words and figures, in which you have doubtless spent considerable time and labour, you are now about to pass into the world of science to become the investigators of truth and order, and to search out the facts which underlie the laws of health and disease.

To this end your powers of observation and judgment are indispensable, and must be steadily and carefully tutored, and your inductive faculty trained to strengthen and enlarge your understanding.

Observation, I say, patient and untiring observation, supplemented when necessary by experiment, is ever needful to the interpretation of the facts you will require to know.

In pursuing the study of medicine all the senses will at one time or another be called into requisition as means of observation, and it will be your first duty to cultivate them to exalt their powers of perception and to enlarge their intelligence.

The eyes must be trained to see, the ears to hear, the tongue to taste, and the fingers to touch. The more these faculties are exercised the more sensitive and reliable they become. I cannot convey to you an adequate idea of the importance which attaches to this discipline and refinement of the senses as factors in the acquirement of medical knowledge. The senses are the avenues or channels by which the mind is fed, and through which our experience of the outer world and the processes of life and disease are acquired. It is, I fear, in consequence of the disregard of their tuition and careful exercise that so many discordant views on questions of soundness are heard in our law courts. Even at the present time a vigorous and most laudable attempt is being made to correct the evils which accrue to our profession from confliction of evidence, by endeavouring to define what does and what does not constitute unsoundness, but I venture to think that the discrepancies of which we complain involve questions of opinion far more frequently than questions of fact—the existence or non-existence of disease much oftener than the nature and extent of disease, and it seems to me that whatever agreement may be arrived at as to the facts of unsoundness, a uniform standard of proficiency in the exercise of our senses and in the interpretation of the phenomena of health and disease can alone redeem us from failure, and relieve us of those troublesome diversities of opinion which so painfully harass our law courts and ourselves.

Passing to the special course of study as set forth in the curriculum of our school, you cannot fail to be struck with the wide and varied field of knowledge over which you will require to travel, and the number and complexity of the subjects with which you are expected to become acquainted. You are, indeed, confronted with a formidable list of sciences, but accept from me the assurance that none of them can be dispensed with. Each is the compliment of the others, a page in the chapter without which medicine is meaningless and abortive. Anatomy, physiology, chemistry, and clinical observation constitute the chief sources of medical knowledge, and to them I would invite your special attention.

Anatomy has ever been regarded as the foundation of medicine, and will demand your most earnest and painstaking attention. Seeing that the object of medicine is to prevent and to cure the countless ailments of the animal body, it will be your first aim to acquaint yourselves with the secrets of its conformation and structure. If you would aspire to a higher position than the ignorant and ignoble quack you must steadfastly devote yourselves to the work of analysing the machinery of life, of acquainting yourselves with the nature, extent, and variety of the numerous organs and parts out of which the body is built up. To acquire this information you will have

recourse to the operation of dissection. Here you will obtain your first insight into the mysteries of biology; and as you proceed diligently to unveil the architecture and design of God's noble works, the spirit of science, at first perhaps cool, almost to indifference, will soon wax warm and resolute, and from the passive observer you will, I trust, in time become inspired with an enthusiastic love of the work for its own sake.

The opportunities for studying anatomy at this school are, I am proud to say, as complete as an enlightened governing body can make them; and if the result of your endeavours fall short of success, the fault must be sought for either in your want of method of study, your incapacity, or your lack of energy. In this important branch of your curriculum you will have ample assistance and guidance in the services of my colleague, Mr. Shave, aided by Mr. Pottinger, both ardent and praiseworthy workers, and who, I am sure, will not only be your guides, but in the difficulties which must at times beset your path, they will prove your advisers and friends. Ever remember in your struggles to learn that your teachers have an interest in your success, and that they delight to render it complete for the honour and glory of their school and themselves. As one who for several years shared in the teaching of anatomy in this institution, let me impress upon you the importance of a practical acquaintance with this branch of your study, and, at the same time, caution you against the delusive influence of books and pictorial illustrations, and I would urge you to rely only on the never-changing, always truthful, *rôle* of nature. Do not, however, misunderstand me; books, like lectures, demonstrations, and diagrams, are indispensable auxiliaries to point the way, to inform you how and where to look, and what to look for, but they all lack the stability of practical research, they fail to refine the touch, to impart manipulative dexterity to the hand, and above all to give the glow of confidence which so inspires the surgeon, and illumines the path of medicine.

The mere book anatomist is a helpless object of pity, a man without resource; he may be elegant and profuse in anatomical learning, but utterly devoid of real knowledge, competent only to ruin the last remaining chance of remedying the defect he may be called upon to treat. He is a man of words without ideas; to him fractures and dislocations have no differential qualities, muscular paralysis and mechanical impediment admit of no distinction, and the brim of the pelvis will at any time suffice for the external iliac. He is altogether oblivious of medical and surgical landmarks, and blinded to the order, beauty, and economy of nature by a chaos of meaningless verbiage. He can fluently run off the origin, insertion, and relations of muscles, the distribution of nerves, and the course of vessels, and do a big and elaborate paper on the structure of the brain and eye; and yet, forsooth, when the parts themselves of which he writes so profusely are brought before him he fails to recognise them. Gifted with a memory for words, he becomes the unfortunate possessor of a large amount of mere information. He is contented to accept anything secondhand to save the labour which real knowledge necessarily entails. Do not let this be said of any of you; for, rest assured, if you elude the vigilance of your examiners, you will not long enjoy the triumph of your indolence. A discerning public will surely sooner or later discover your spurious and worthless qualification.

Besides furnishing you with the facts of anatomy, thorough and painstaking dissection will also strengthen and enlarge your faculty of observation, and lay the foundation for a methodical pursuit of the sister sciences; it will likewise enlarge your aptitude for work, and give you confidence in all you say and do in which the structure of the body is concerned. As a means of framing the mind to observation and to thought, I know none more

simple and effectual. Let me entreat you to lose no opportunity of acquiring a knowledge of anatomy. Much of the skill and manual dexterity of the surgeon is acquired in the dissecting-room. It is by the knowledge obtained there that he is enabled to direct his knife so safely and surely amidst the most intricate and delicate structures, and thus cut short disease and spin out the thread of life. In no less degree it subserves the purposes of the physician and the physiologist, and thus conduces to the science and art of medicine.

Equally with anatomy will the science of chemistry demand your earnest and painstaking attention. Besides affording you the more general information concerning the intimate relations of matter, which in itself is most interesting and attractive, it will likewise give you an insight into the nature and composition of the elementary tissues of the body and of the various secretions which are elaborated within it, and at the same time enable you to appreciate those complex chemical processes which are constantly taking place from the beginning to the end of life. The manner in which the food is digested and assimilated, in which the blood is changed from arterial to venous, as well as numerous other phenomena which occur in the laboratory of life, would all be intellectually lost but for a knowledge of this all-pervading science. If you desire to become sound physiologists, you must first become good chemists. There is no possibility of your accomplishing the one without fairly mastering the other. Further, a knowledge of chemistry will enable you to understand the nature and properties of drugs, how to combine them properly, and also to judiciously apply them in the treatment of disease. Its application to pathology is also of the highest importance. Of this you will have ample daily experience in the wards of the hospital, where chemical reagents will frequently be employed in determining the existence of disease, and the nature of those adventitious products which so frequently imbue the solids and fluids of the body.

Moreover, it cannot be doubted that an intimate and increasing knowledge of chemistry has contributed in a very large measure to the efficiency of preventive medicine, by placing within our reach the means wherewith to combat the spread of contagious and other disorders. With your minds fresh and full from the study of anatomy and chemistry, you will then proceed to consider the animal body in an altogether different light from that in which you have recently viewed it.

You have explored its complex physical structure, and carefully examined and admired its exquisite workmanship. Each part has been separately submitted to a searching investigation, both in itself and in its relations to those about it, as well as to the whole; you have, in fact, unravelled the architecture of the dead and motionless organism very much in the same way as you would study the construction of a steam-engine or the mechanism of a watch. But this is far from sufficient for the purpose of your calling. The machinery you have been contemplating so intently must now be studied in its active living state, and it should be your earnest endeavour to find out its mainspring of action, and the influence by which it is maintained and governed.

To this end you will seek the aid of that all-absorbing and fascinating science, physiology. The study of physiology, like many other sciences auxiliary to medicine, is daily becoming more and more a subject of general interest. Although an imperfect science, many important problems relating to the functions of the animal economy have undergone solution, and if you may judge of the activity and earnestness which physiologists everywhere display in searching after new truths, more complete and precise knowledge of the conditions and laws of life must sooner or later ensue. At the present time a knowledge of physiology is being largely diffused by our teaching

schools, and there can be no doubt that it will sooner or later become a part of the education of all classes of society. It is right and good that man should understand something of the forces within him, and the relation of those forces to the outer world as a means of safeguarding his own health and prolonging life. Constituting as it does the chief element of rational medicine, it is to you indispensable. On a knowledge of healthy function rests the success of pathological inquiry. As Dr. Michael Foster has pointed out, "physiology is closely related to or even identical with pathology, and can no more be separated from it than meteorology can be divided into a science of bad and a science of good weather." Disease is no longer regarded as a material entity, or something to be dislodged from the body ere health can be restored; but just as the gentle breeze may develop into an irresistible hurricane, and the trickling and fertilising rain into a deluging and destructive shower, so may the physiological states of the body pass imperceptibly into conditions which we recognise by the term disease, *i.e.*, a disobedient and disordered physiology.

This being so, it will be obvious to you that much requires to be known and understood of those "visible motions and invisible changes which go on in the body and constitute its life," ere you can recognise and appreciate the disturbing causes and processes of disease.

In seeking to become acquainted with physiological science, I would strictly caution you against the too common error of disregarding those elementary facts upon which much of the practical usefulness of the science mainly rests. A large amount of practical physiology may be found where it is the least sought after, viz., in the stable, the byre, the kennel, the fold, and the hospital; there you may see and contemplate the experiments of nature uninfluenced by the mechanical, chemical, and surgical devices of the laboratory.

Here nature demonstrates her truths in her own truthful way, and to her inimitable teaching I would earnestly commend you. The high road to a knowledge of disease is through a knowledge of health. Betake yourselves, then, on every convenient occasion, to the places I have indicated; note how the dog seizes his food with the teeth, the ox with the tongue, and the horse with his lips. Watch the brief chopping action of mastication in the one and the prolonged grinding action in the others. See how the ruminant leisurely returns the food to the mouth and repeats the process of mastication and insalivation. Watch the regular and ceaseless ingress and egress of air from the lungs, the force and frequency of the pulse, and note the accompanying sounds which flow from the chest as the result of the heart's beat. Consider the facts thus obtained by the light of your anatomical knowledge, and if you do not acquire a zest for physiological research in its higher aims and more complex methods, you are but little imbued with the spirit of science. From the study of anatomy, physiology, and chemistry, you will proceed to consider the most important branch of medical education, viz., clinical instruction.

Just as anatomy and chemistry are the foundation of physiology, so is clinical knowledge the foundation of practice. Inasmuch as practice is the aim and object of all your labours here, and the great secret of your success hereafter, you cannot too soon familiarise yourself with the phenomena of disease and the means to evercome and to prevent it.

In this connection you will experience golden opportunities and priceless privileges, and in all earnestness let me entreat you not to lose the one or abuse the other. You will now be called upon to apply the principles inculcated by your various teachers to the elucidation of all that concerns disease—indeed, to bring the knowledge you have acquired in the dissecting-room, in the laboratory, and in the lecture theatre, to bear on the recogni-

tion and interpretation of the phenomena pertaining to altered function and disordered structure.

The opportunities you will enjoy in this institution for acquainting yourselves with the methods of practice contrast in no small degree with those afforded to former students who, with myself, occupied the benches on which you now sit seventeen years ago. As you now find it, clinical teaching has only existed for a brief period. At the time referred to it was cold and fitful, desultory, and weak. It lacked besides the spirit and method, the depth and breadth, as well as the appliances and facilities which characterize the teaching of to-day.

Hospital practice, as it was then termed, was very much of the same description of occupation as that known as "walking the hospital" in our sister profession. Headed by the clinical teacher, so many of the students as felt disposed would promenade through the wards at very uncertain hours, on equally uncertain days. The result was that the art of medicine reached only those who were determined to pursue it.

It is satisfactory to know this is not so now, as many of you are aware. Recognizing the vast importance of this branch of your studies, I was induced a few years ago to direct the attention of the governing body to the necessity of a more extended and methodical system of clinical instruction, and to lay down the plan which is now so successfully followed. I am proud of having initiated systematic clinical teaching, because of the great good it is competent to effect, because without it the practical art of medicine has no existence.

At the present time our course is so framed that not one can escape the teacher's attention, none can remain ignorant except the most imbecile and perverse; all are trained to observe, to think, and to work, and to reason on the facts which are brought before them in their search after disease. Among other matters pertaining to clinical medicine you will be called upon to exercise your powers of investigating the medical history of our patients by examining and cross-examining their attendants. You will then pass on to the methodical examination of each physiological system of the body, in the course of which you will be instructed and drilled in the employment of all those mechanical appliances which from time to time have been designed for the purpose of enlarging our range of perception. The microscope, the ophthalmoscope, the stethoscope, the thermometer, and various other instruments of precision, will all at one time or another occupy your attention. Having collected your data and subjected them to careful analysis, separating those that are essential from such as are accidental, you will then be called upon for a diagnosis and afterwards to prescribe, and render your reasons for employing the medicinal agents you may select. From day to day you will review the history of the cases under observation and note their progress or recession.

This form of teaching will be supplemented by clinical lectures, when one or more of the various cases to which your attention has previously been directed will be brought before you in this theatre and submitted to a careful clinical analysis. The medical history of the case will then be fully examined. The physical and rational signs of disease will be grouped together in their physiological relations. The order and succession of the symptoms will be likewise noted, and their individual and relative importance pointed out. In this way the outward and visible signs will be made, as far as possible, to elucidate the nature and extent of the inward and invisible change. The pathological state having been defined, your teachers will then direct your attention to such other disorders as are capable of giving rise to the same prominent symptoms as the one under consideration, and at the same time frame a differential diagnosis for your guidance. The

therapeutic measures adopted will also be carefully discussed, and their success or failure indicated. Finally, on the clinical experience thus obtained an endeavour will be made to foretell or prognose the result of the case. This is briefly our method of imparting clinical information. But, gentlemen, clinical medicine can no more be taught by lectures than can anatomy be taught by diagrams ; and the most lucid demonstrations from the most gifted teacher will avail you little if you disregard your own intellectual training. If you desire to become good practitioners, as I sincerely hope you all do, your knowledge must be of that thorough and real description which personal investigation alone can make it.

The hospital wards should be your chief resort, and to learn your work efficiently you must see with your own eyes, feel with your own hands, hear with your own ears, and think for yourselves. Your first aim should be to acquire a knowledge of the natural history of the various diseases, *i.e.*, the characteristic course they take uninterrupted by art, and to estimate the modifying influence of age, sex, condition, occupation, season, climate, etc. This will not only prepare you for the endless variety which the same disease exhibits in different patients, but it will likewise enable you to estimate the gravity of the result, and to foreshadow impending danger ; or, on the other hand, to subdue unnecessary anxiety and alarm. It will, moreover, save you from embarking in those discreditable therapeutic ventures where success is impossible.

In commencing your clinical studies, let the first cases you take in hand be of the simplest description. Do not, as is too frequently the case, waste your time in endeavouring to solve abstruse pathological problems before you are well able to recognise the common signs of illness, but gradually proceed from the more simple to the more complex ailments, and in the former, as in the latter, let your inquiry be full, precise, searching, and methodical. If your immediate observations fail to satisfy you, as they often will, then seek the aid of the various mechanical, chemical, and instrumental devices by which a more intimate knowledge of your patient's condition may be acquired. In conducting your clinical inspections, let your note-book be constantly before you. Write down in simple language every symptom and sign of disease as they present themselves, and mark the period and nature of the changes which occur from day to day. "Watch with a questioning mind the administration of drugs, and in the events which follow take heed lest you set forth as their effects phenomena which belong only to the period or progression of the disease."

In all cases where death ensues follow your case to the *post-mortem* house, and there institute a searching examination of the body. Compare the morbid changes disclosed with the symptoms observed during life, and with the view you have formed of the seat, nature, and extent of the disease. Unless this be done you cannot hope to make real progress.

If you ask by what means all this is to be accomplished, I say our hospital and school are replete with all the requirements of a strictly scientific education, and afford advantages for real progress which are not to be found in any other school in the kingdom. Besides accommodation for over one hundred equine and other patients, the hospital is provided with hot-air and other baths, and a well-selected stock of modern instruments and appliances for the investigation and treatment of disease. In addition to the indoor patients, you will have an opportunity of seeing and studying the miscellaneous ailments of a large number of outdoor sick presented by the poor of this metropolis and by the subscribers to the College. Among them will be found accidents, disorders, and diseases of every type and character, and in every phase of their history.

In the school the characteristic features of to-day are the decidedly prac-

tical nature of the teaching and the facilities for the acquisition of real knowledge. Every one of you, from the moment you enter the school to the day when you depart from it, will be called upon to take a share in the practical work of the subjects laid down in the curriculum. Practical anatomy, practical chemistry, practical pathology, and morbid anatomy, practical botany, practical surgery—everything you engage in, indeed, is brought before you in a practical and mind-engrossing manner. Are not these, I would ask, golden opportunities? are they not rare privileges? do they not glitter with promise and irresistibly invite your sincere and zealous attention? Are they not worthy of all acceptation? It is well you should remember that your future labours will not be exclusively devoted to the business of doctoring, but in numerous instances will assume a decidedly educational character. As public servants, you must expect to be interrogated on matters about which your clients desire information for their future guidance. Your knowledge of the laws of health will be constantly appealed to in the discharge of your professional duties, and you will soon find how desirable it is to cultivate the faculty of imparting to others such useful information as will enable them to guard against disease. In this respect hygiene and sanitation, the sciences of health and preventive medicine, are subjects about which you will be the special teachers and guides of the stock-owners of the nation. The words of Rollet, "Medicine cures individuals, hygiene saves the masses," and the maxim of Hippocrates, "Nature is the healer of diseases," express wholesome truths not less applicable to animals than to man. The influence of food and water, ventilation and drainage, physical conformation of locality and geological formation, and of the habits and relations of animals, are among the many subjects concerning which you will require to enlighten those who seek your aid.

You need be in nowise apprehensive of inflicting upon yourselves any serious personal loss by instructing those who are accessible to sound teaching. Labour is not always immediately remunerative, but rest assured that wherever your precepts are found to be reliable there your practical skill will be most sought after. It is a feature in the life of our greatest men that they have risen to eminence in a great measure by the determined force of gratuitous labour, by that quality of mind which finds its highest enjoyment in the exercise of an unselfish and magnanimous spirit. Let, then, the aim of your life's work be to shed light abroad, to inculcate the teachings of science for the well-being of the brute creation, whom it is your mission to safe guard, and of the commonwealth whose interest is inseparable from it.

Dignified and important as the profession of veterinary medicine undoubtedly is, though it exacts the largest personal sacrifices from those who pursue it, it cannot be said to bring great rewards, either of rank or wealth. Peerages and pensions do not wait upon the labours of our young craft. If, therefore, honours and riches be the sole aim of any one of you, if you have no higher ambition than to amass wealth and to win the smiles of court, you had much better retrace your steps, and leave us in the undisturbed enjoyment of that sense of usefulness and elevation of character which we derive from the contemplation of natural science and the greatness and beneficence of our calling. If, however, the veterinary profession does not lead to the accumulation of large fortunes, no one, Sir Benjamin Brodie has said, "who uses the means proper for the purpose, will fail to succeed sufficiently to gratify a reasonable ambition."

I have endeavoured to show you in a very imperfect way how the science and art of medicine are to be wooed and won.

Let me, in conclusion, entreat you to cultivate and foster a genuine love of your profession, and an honest desire to duly fit yourselves for its success-

ful pursuit. Your parents, your teachers, and your school, actuated by a pure and lofty sentiment, are mutually resolved to afford you all the requirements wherewith to commence the responsibilities of your calling, and they ask through me in return that you will earnestly strive to render yourselves worthy of the sacrifice they so willingly make on your behalf. Bear in mind that the vocation you seek to follow is that of a gentleman, and appeals at every step to your higher nature and the discipline of your moral force. Cultivate the virtue and the truth of manliness, with all the attributes needful to a man. However great, or however humble, may be your intellectual attainments, add to them the power of goodness, integrity, consistency, and honour. Knowledge without character is like mind without heart, a goodly apple rotten at the core. Possessed of both, you are then rich indeed.

Thus far together we have travelled on, and now we part. Fare you well. If but one noble thought, one high resolve, one lofty purpose, or one heavenly aim hath been begot or nurtured by the page, we have not met in vain."

General BURNABY, in presenting the prizes, alluded to the improved and improving position of veterinary medicine in this country, pointing out that the Royal Veterinary College had furnished a large proportion of the members of the Royal College of Veterinary Surgeons who were now practising in every part of the British empire, and urging upon the students the necessity for education, and particularly a knowledge of the French language. He distributed the prizes to the successful students in the following order :—

Coleman Prizes.—Silver Medal, Mr. H. Sumner ; Bronze Medal, Mr. J. Sutcliffe Hurndall ; Certificates of Merit, Mr. C. J. Humphrey and Mr. A. H. Archer.

Cattle Pathology Prizes.—Silver Medal, Mr. C. J. Humphrey ; Certificate of Merit, Mr. H. Sumner.

Scholarship.—£25 per annum for Two Years, Mr. Ernest R. Butler ; very highly commended, Mr. Edward Taylor.

Class Prizes.—Class C.—Hippopathology, Mr. H. Sumner ; Cattle Pathology, Mr. H. Sumner ; Morbid Anatomy, Mr. H. Sumner ; Helminthology, no award, Mr. J. B. Gresswell commended. Class B.—Anatomy, Mr. J. Morton ; Histology, Mr. E. H. Hazelton ; Physiology, Mr. L. J. Blenkinsop. Class A.—Chemistry and Toxicology, Mr. E. Taylor ; Practical Chemistry, Mr. E. Taylor ; Materia Medica, Mr. E. Taylor ; Botany, not yet decided.

Army Veterinary Department.

Gazette, September 26th.

VETERINARY DEPARTMENT.—The Under-mentioned Veterinary Surgeons to be Veterinary Surgeons of the First Class.—F. C. Boulter, F. W. Going, S. L. Pallin, C. Phillips.

The *Army and Navy Gazette* has the following remarks regarding the recent campaign :—

"We learn that the health of the horses belonging to the force in Egypt has been remarkably good during the late campaign. With the exception of the losses caused by severe exertion under a 'roasting' sun, and the exhaustion produced by the same cause, and also the starvation they had to undergo through absence of forage, there has been nothing serious to report with regard to the horses from England. A number were killed, and more wounded, in the different engagements ; but the veterinary arrangements

appear to have been so well ordered, and the veterinary officers so efficient and zealous, that we believe the results, from a sanitary and medical point of view, will be most satisfactory. We wish we could say as much for the veterinary arrangements of the Indian Contingent. As usual, the Indian authorities seem to have overlooked the necessity for having a sufficient veterinary staff, or even for sending into the field animals free from those contagious diseases which soon play havoc. In fact, in Egypt we had Afghanistan repeated, and had the campaign lasted a few months longer, there is only too much reason to believe that the consequences of this neglect would have made themselves felt in a very unpleasant manner. The 6th Bengal Cavalry had Glanders among the horses when disembarked in Egypt, and when the regiment arrived at Ismailia, a troop in which the dangerous disease had caused the death of fifteen animals had to be sent back to Suez—*hors de service*—in order to prevent the infection spreading to the other regiments and corps. It would also appear that from lack of inspection previous to embarkation, the slaughter-cattle for the Indian force were infected with Cattle-plague: and notwithstanding the energetic action adopted when the disease was discovered among them in Egypt, it is feared that the native cattle may have become affected, and if so, the holders of Egyptian bonds will have little cause to thank the Indian Government. It is reported that for the care of 6,000 animals sent from India, there were only two veterinary surgeons!"

A cavalry field-officer writes from Egypt to the same journal, as follows:—"I should like to say a few words in favour of the veterinary arrangements of the expedition. There will be a feeling of disappointment throughout the cavalry, unless the officers of the Veterinary Department receive, when the rewards are distributed, their fair share of 'honours.' It is not too much to say that the veterinary is the only department which has done its work properly, and it reflects no small credit upon the members of Mr. Meyrick's staff that they have been able to fight as they have done against the great difficulties which have had to be overcome. On the principle of giving credit where credit is due, I feel it my duty to express, on the part of all cavalry officers, their indebtedness to the Principal Veterinary Surgeon and his assistants."

Obituary.

THE death is announced of an old and respected member of the profession in London, Mr. JOSEPH WOODGER, M.R.C.V.S., who graduated in 1852, and died at the patriarchal age of eighty-two years.

The demise is also reported of Mr. PETER FINDLAY, M.R.C.V.S., of Glasgow, a graduate of 1865; Mr. J. B. MCGREGOR, M.R.C.V.S., of Crieff, Perthshire, a graduate of 1868; Mr. R. P. LORD, M.R.C.V.S., of Baltimore, who graduated in 1873; and Mr. H. O'S. KEYES, of Limerick, who was registered a member of the Royal College of Veterinary Surgeons in October, 1881.

Notes and News.

CATTLE DISEASE IN JAVA.—The island of Java has of late years been sorely troubled by cattle plague. It has prevailed to a disastrous extent in the western part of the island, where over 93,000 head of cattle were destroyed to prevent the spread of the disease during 1880. During the first half of the following year, notwithstanding this sacrifice, over 11,000 beasts died, and nearly 35,000 were slaughtered. Towards the close of 1881 a

marked improvement was noticeable, and this was attributed to the very stringent precautions taken by the authorities to prevent the disease going beyond the line to which it had crept up during the previous year. Two bamboo fences were erected right across the country from one shore to the other, at a distance of about two miles from each other, one fence being planted a short distance from the infected districts. The intervening space has been held by a strong civil and military watch, and all transport from one district to the other likely to convey contagion has been rigidly prevented, not even individual travellers being permitted to cross the cordon without undergoing a process of disinfection. The Netherlands Indian Government spent in preventive measures and in compensation for compulsory slaughter, 6,368,900 florins during the year 1880, and probably about the same last year. Java is fortunate in its elongated form, which, after a heavy loss, seems to have suggested the means of at least arresting the extension of the disease, and it is now hoped that it may be effectually stamped out.

FLUKE IN SHEEP.—Thousands of sheep died in Devonshire and Somerset two seasons since from fluke. The result is that the flocks have not yet recovered. At the commencement of last winter the Devonshire county veterinary surgeon, Mr. Heath, decided to experiment upon a flock, to see if by any means the disease could be combated. On October 13th, at a meeting of agriculturalists at Exeter, including Earl Fortescue, Lord Ebrington, M.P., and Mr. Acland, M.P., he gave the results of his experiments. He announced that they had been attended with success. It being admitted that fluke was developed in permanent pastures and taken into the system with the food, he turned out the flock in pastures that hitherto had been fatal to sheep. One half he allowed to feed their own way, but with the food taken by the remainder he every day mixed a quarter of an ounce of salt and half a pint of corn. On killing the uncared-for portion of the flock this summer, he found their livers full of fluke, so that they could not have lived another winter, whilst the sheep to which the salt and corn were given were perfectly sound. The greatest satisfaction was expressed by the large body of agriculturalists present at the success of the experiments.

DEVELOPMENT OF BACTERIA.—The researches of Pasteur and Darwin have shown how earthworms may aid the diffusion of small organisms, some of which may produce disease. Professor Schnetzler states that the dejections of earthworms always contain numerous living Bacteria and their germs (the hay Bacterium included). It is clear that Bacteria in enormous quantity float in the air about us; and we have at easy command, Professor Schnetzler points out, a small apparatus traversed by about 8,000 cubic centimetres of air per minute, which may inform us as to these floating germs. This is no other than the nasal cavity, on the mucous surface of which air-particles are deposited. To observe these he advises injecting the nose with distilled water (completely sterilised), by means of a glass syringe previously calcined. The liquid so obtained is put in one carefully cleaned watch-glass, and covered by another. With a microscope magnifying 700 or 800 diameters, one finds, among various particles in the liquid, some real live Bacteria. If the liquid be kept a few days in a clean glass to be hermetically sealed, the Bacteria are found to have increased very considerably. One sees *Bacterium termo*, *Vibrio*, *Spirillum*, *Bacillus subtilis* even some *infusoria*, and spores and fragments of fungi. Professor Schnetzler has further successfully cultivated the organised germs by means of a mixture of gelatine and distilled water. Why do not those Bacteria in the nasal cavity always multiply and develop, and penetrate to the windpipe and lungs? Their progress is doubtless opposed by the vibratile movements of the cilia, or minute hairs of the epithelium covering the mucous membrane of the air-

passages, and the feeble alkaline reaction of the nasal mucus may, it is also suggested, be unfavourable to some of them. Cohn has proved that Bacteria giving rise to acid fermentation perish quickly in liquids having an alkaline reaction. Infectious Bacteria may, however, multiply to a formidable extent on living mucous surfaces; witness the growth of the *micrococcus* of Diphtheria, brought by the air into the air-passages; also the Bacterium of Anthrax. The Bacillus of Tubercle, as Koch has lately shown, may be transmitted from one person to another by the air-passages. Professor Schnetzler is of opinion that Hay-fever may also be due to Bacteria entering the nose. While the development of Bacteria on normal mucous surfaces is usually limited, millions of them are found in the dejections of healthy children.

TESTIMONIAL TO MR. HUTCHEON, COLONIAL VETERINARY SURGEON, SOUTH AFRICA.—We are extremely gratified to learn that the agriculturists of the Bedford and Adelaide districts in the Cape Colony have presented Mr. Hutcheon, M.R.C.V.S., Colonial Veterinary Surgeon, with a valuable microscope, a gold cup, and a watch, in testimony of his great services since his arrival, and more especially in recognition of his successful efforts in suppressing the epizoöty among the Angora goats, and which threatened at one time to exterminate these important animals. At the complimentary dinner given to him in Adelaide, at which the presentation took place, well-deserved praise was awarded him, and high encomiums passed as to his ability and zeal. Our colleague must be congratulated on the remarkable success he has so soon met with in Africa.

THE FORTHCOMING INTERNATIONAL VETERINARY CONGRESS AT BRUSSELS.—Mr. Fleming, Army Veterinary Inspector, has been appointed by the Organizing Committee of the International Veterinary Congress, which meets at Brussels next year, to prepare a report in association with M. Lydtin, Superior Veterinary Surgeon to the Grand Duchy of Baden, on Tuberculosis, from a pathological and sanitary point of view; this report is to serve as a basis for the discussion which is to take place on this malady.

A HORSEMAN'S KNIFE.—Our colleague, Captain Hayes, has devised and patented a knife which will be found useful by horsemen and veterinarians, as an every-day article of equipment. Without being too large or heavy for the pocket, it contains, in addition to other essential articles, an excellent searcher, which will render the contrivance still more acceptable to members of the veterinary profession. The knife is strong and well-finished, the handle being nickel-plated. It is made by Young, cutler, Edinburgh.

OXYGENATED WATER.—Experiments have recently been made in Rome by Signors Capranica and Colasanti, which are referred to in *Nature*, regarding the action of oxygenated water on the system. Physiologically absorbed (according to Hueter's method), the substance acts as a poison, quickly killing animals, the fatal dose varying with the animal's size (about 25 cc. is enough for a dog weighing three kilogrammes, 75 cc. for one weighing 13 kilogrammes. The poisonous action appears in all the great functions of the body, especially that of the spinal cord; the exito-motor power of that organ is overexcited, as shown by convulsive phenomena (tetanus, and locomotor ataxy). The physico-chemical acts of nutrition are also profoundly disturbed, as is proved by the very pronounced glycosuria previous to death. All these disturbances are attributable to decomposition of the peroxide of hydrogen in contact with the tissues. The consecutive phenomena in poison with oxygenated water are identical (the authors say) with those M. Bert has observed as resulting from the action of the compressed oxygen.

Correspondence, etc.

THE INTERNATIONAL VETERINARY CONGRESS: FOURTH SESSION.

HONOURED COLLEAGUE,—Nearly twenty years have elapsed since Professor John Gamgee, of Edinburgh, issued the first invitation for an international reunion of veterinary surgeons. This reunion took place at Hamburg; and at it was discussed the necessity for certain sanitary police measures with which to oppose Cattle Plague and Contagious Pleuro-pneumonia, as well as drawing up a list of the various diseases which should be the object of special arrangements. At this first assembly it was also decided to draw the attention of the different governments to the utility of a sanitary supervision of travelling droves of domesticated animals, and to the advisability of receiving reports from competent persons, as to the outbreak and termination of panzoötic diseases, as well as all contagious disorders. The Congress was, in addition, occupied with a consideration of the measures to be adopted against Sheep-pox, and on this occasion the value of inoculation in that disease was discussed. In terminating its labours, this assembly expressed the desire to see published statistical information concerning the different panzoöties, and it decided that another international reunion should take place at Vienna in 1865.

On March 30th, 1865, the organising committee of the second session of the Congress published its programme. This comprised :—

(*a*) The continuation of the discussion relative to the necessary duration of an efficacious quarantine, and the measures applicable to the offal of animals, in order to prevent the invasion of Cattle Plague.

(*b*) Examination of the disinfection measures applicable to waggons and ships which have carried cattle, and the determination of a uniform system of cleansing to be adopted in the different countries.

(*c*) Study the causes of Rabies, and ascertain the results obtained from certain measures with a view to prevent the transmission and development of this malady; as well as the eventual determination of general regulations against the malady.

(*d*) Examination of the laws respecting unsoundness in animals, and fix on the bases of international legislation with regard to them.

After discussing these, the Congress adopted the principles which ought to serve as a basis for the regulation of all these points in the various countries. These principles will be found, in the form of appendices, in the report of this second international reunion which, before separating decided that a third Congress should be held at Zurich, in September, 1867. This new Congress, which assembled on the second and sat until the eighth of that month, discussed the following subjects :

(*a*) Experiments and information relative to Cattle Plague during the two previous years, and their influence on the prevention and suppression of this malady.

(*b*) Relations of contagious Pleuro-pneumonia to other forms of Pneumonia, and the measures for combating the former of these affections.

(*c*) Inspection of meat.

(*d*) Veterinary education.

(*e*) Organisation of veterinary service.

The first and the three last of these questions was submitted to a long discussion, the result of which were resolutions or principles, a *résumé* of which is given at the end of the report of the proceedings of the session. With regard to the second of these questions, the Congress, through insufficient time, was compelled to formulate the principle that "Pleuro-pneumonia

should, with regard to sanitary police measures, be considered as only propagated by contagion."

A fourth international Congress of Veterinary Surgeons should have been held at Brussels in 1870.

Three members of the Zurich Congress were entrusted with its organisation ; but circumstances beyond their control prevented them carrying out this intention.

The Congress of 1883 will, late though it be now, carry out the wishes of that of Zurich. The committee formed to organise it has considered it advisable to connect this new international assembly with the one preceding it, and it believes that it cannot do better, in drawing up a programme, than take up the question which could not be discussed by the Zurich meeting ; and it all the more readily adopts this course, from the fact that the question as to the differential diagnosis and the prophylaxis of contagious Pleuropneumonia, no matter by what means, maintains all its importance. In accepting this question, with the other subjects for discussion at the Congress, the commission has otherwise conformed to the wishes expressed by several of the adherents of this Congress, in their reply to the circular in which they were requested to indicate the questions they desired to have discussed at the new assembly.

Having regard to the exigencies which have arisen since the decision of the Zurich Congress, and to the desire expressed by several veterinary societies, as well as by a number of practitioners, the Commission has considered it useful to again call attention to the wishes expressed *à propos* the fourth and fifth questions in the programme of this Congress (see the end of the present circular); and it has considered it necessary to act thus, not only from the motives already indicated, but also because that—so far as these wishes are concerned—in several countries they have remained more or less a dead letter. A new examination of the wishes relative to instruction and to veterinary organisation appears all the more opportune, inasmuch as the Zurich Congress left altogether on one side the general and international part of this organisation.

The international regulations with regard to practising veterinary medicine—at least on the frontiers—is included in the general wish ; but it necessitates the preliminary organising, in all the contracting countries of equal instruction.

The organising of an international service for affording prompt information, by special correspondence, the drawing up of statistics, etc., calculated to make known the sanitary condition of the domesticated animals, the supervision of disinfection and means of transport, in their relations to veterinary sanitary police, etc., are all so many questions which are certainly not foreign to a good organisation of this service.

The discussion of the fundamental principles of a good inspection of meat, and also of uniform legislation with regard to soundness, should also figure in the programme of the Congress of 1883, if these questions have not been amply discussed in previous Congresses.

The organising Commission of the future international assembly has thought it its duty to draw special attention to a subject which is related at once to the alimentary hygiene of man and the preservation of certain of the domesticated animals. This subject which at least touches in one way on the inspection of meat, is related to the measures of sanitary police with which to combat Tuberculosis (*Phthisie pommeliere*).

In taking for its basis the preceding considerations, the Commission has drawn up the following programme for the fourth session of the International Congress of Veterinary Surgeons :

1. Is there any reason to modify, in any way, the principles and resolutions

arrived at by International Veterinary Assembly at Zurich, relative to the teaching in veterinary medicine?* In the affirmative, what are these modifications?

2. What are the ameliorations which might be usefully introduced into the present organisation of everything relating to the veterinary service, as much with regard to special regulations in different countries, as with a view to international necessities.†

3. What are the characters which establish the differential diagnosis of Contagious Pleuro-pneumonia, and what are the measures necessary to prevent the development and propagation of this malady?

4. What is the part played by contagion and heredity in the development and propagation of Tuberculosis, and what is the influence on man and animals of the consumption of the flesh and milk of animals affected with the disease? What are the means to be adopted to prevent the development

* Principles and resolutions adopted by the Congress at Zurich, with regard to the organisation of a Veterinary Organisation by the State :

A Veterinary Organisation cannot attain its object unless it fulfils the following conditions :

1. The practice of veterinary medicine should be regulated by law.
2. Veterinary medicine should be an integral, but independent branch of the Sanitary administration.
3. It should be represented by competent persons in connection with the inferior, middle, and central authorities.
4. None should be allowed to practise veterinary medicine except those who have undergone the regulated studies in a public veterinary school, and who have received —after examination—the diploma or legal position of a veterinary surgeon. Such alone should receive this title.
5. Every veterinary surgeon may be employed as an expert by individuals, but the judicial authorities should only employ as competent persons officially recognised veterinarians.
6. In the case of Sanitary police, the administrative authorities should only exceptionally employ others than those officially recognised as competent.
7. Every veterinarian should have the right to supply the medicines necessary in his practice, but under proper control.
8. The expression "Competent person" should only imply diplomated veterinary surgeons.

† Principles and resolutions adopted by the third International Veterinary Congress, with regard to instruction :—

Organisation of schools, their union with universities or other teaching establishments. Preliminary instruction. Development of studies.

1. The preparatory education for the study of veterinary medicine should be as extensive as that required for the study of human medicine. It is desirable that, without delay, the same amount of preliminary knowledge should be possessed by candidates for admission to the study of veterinary medicine as for entrance to the universities. But inasmuch as, for various reasons, in the present state of affairs this cannot be demanded, the Congress has decided that the minimum of this knowledge to qualify for entrance to veterinary studentship should correspond to the second examination imposed for admission to a university.
2. Three years at least are necessary for the special studies of veterinary medicine. There should not be different classes of veterinary surgeons, according to their different degrees of instruction.
3. The veterinary schools may be separate, autonomous establishments, or be joined to universities or other establishments for superior education ; but veterinary medicine should be taught in special chairs. Disapproval must be expressed as to the institution of a university chair in which only one professor forms veterinary surgeons, as this mode of instruction is absolutely insufficient.
4. This necessary organisation of veterinary teaching should be adopted, wherever veterinary medicine is conveniently established.

and transmission of this affection, as well as the pernicious influence of the milk and flesh of diseased animals, if this influence is real?

Receive, honoured colleague, the assurance of our most distinguished sentiments.

A. THIERNESSE, *President* { *Of the Organising*
DR. WEHENKEL, *Secretary* { *Commission.*

Brussels, *1st September.*

IS SYSTEMATIC TRADING IN HORSES COMPATIBLE WITH THE CALLING OF VETERINARY SURGERY?

SIR,—This "silly mania" of mine, courteously so-called by a high authority a short time since, has now possessed me for the space of twelve years, and as very recently our respectability as a body has been publicly assailed by the conduct of two of our members, I trust you will agree with me that the time has arrived when this (sad to say) vexed question is for ever set at rest by a thoroughly honest opinion being given as to its propriety.

Allow me to make two uncompromising statements; firstly, that it is largely carried on, in some form or other, by many of our members; secondly, that it is supported by argument and held to be consistent by many others holding the highest positions and titles.

The questions raised in my mind are the following:—Is ours a trade or a profession? Can its members consistently conduct both? Is not the animal machine of such a complex and changeable nature as to deter common honest sense from trafficking in, or from being liable for anything beyond a conscientious opinion as to the state of its health? Does the practice of horse-dealing harm the profession in public estimation? Is the moral teaching of our schools to be set at nought? Are the highest aspirations which are then felt to be afterwards thrown aside or replaced by baser and more sordid views? Are all the noble attempts to raise our calling to a scientific appreciation to be thwarted by the selfish greed of gain? Is all sentiment in the intellectual welfare of veterinary medicine mere balderdash, and is school philosophy to be set aside in the battle of life, to be cast off at pleasure as a useless conception, or only to be tolerated as a hypocritical cloak for assumed importance? Nay, rather, should not all the moral etiquette in our composition be used as armour to defend us from the many temptations that come to us individually, and to protect our profession from the assaults of the vulgar? Of course, all respectable veterinary surgeons carrying on trade will repudiate, with scorn, being classed with such men as have lately figured in the police-court; but are they free from the taint? Do they not sully the name? Would they like to own at a social or scientific gathering that they trade in horses? In short, are they not ashamed of what they do? If they are not, *chacun à son goût!* but let them be consistent, if they can, and not usurp the rights which only belong to purely professional men, or seek to legislate for the advancement of a calling which, to them, can be looked on as a mere means of gain. The social ostracism that surrounds us will never be cleared until this degrading incubus is got rid of; for so surely as the veterinary surgeon is the trader, half-trader, middleman, or what not, so surely will he be looked on with suspicion by the public, and the profession he represents be classed as third-rate.

The public, as an author in your journal once quoted, are prone to appreciate a man at the estimation in which he holds himself, and if he stoops to the level of the horse-dealer, he, lacking proper pride, sinks, and we as a body are sufferers.

I fear I shall bring a hornet's nest about me for these remarks, and probably be accused of feeling pique; but it is a mournful regret, not unmixed with disgust, that prompts me, in however such an insignificant manner, to agitate in what I consider to be the direction of reform. Besides which, I think it is highly discouraging and unfair to those who seek by all the means in their power to raise the tone of veterinary surgery, that they should be frustrated in their endeavours by impediments in "high places."

"You cannot hope to educate the masses; such a course will only bring disappointment and beggary to yourself," was another principle lately sought to be infused into my mind. But surely each individual can, by showing his distaste for all that is unprofessional, do his little to impress the masses, whether they be of his own occupation or not, with the idea of honesty of purpose; and I can only hope that many of my brethren share my views; at the same time, I trust I am not too severely wounding the sensitiveness of those who think and act differently.

I leave it, Mr. Editor, to your impartial judgment to determine as to the publishing of this letter, and remain, yours obediently,

63, South Audley Street, W. HENRY DYER.

Oct. 10th, 1882.

ANSWERS TO CORRESPONDENTS.

M.R.C.V.S.—The period for registration of existing practitioners expired on August 27th last.

J. F. MURRAY, TRALEE.—Blistering the coronets in acute Laminitis is decidedly contra-indicated, as it will most probably be followed by very serious results.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from J. A. Nunn, A.V.D., India; Major-General Sir F. Fitzwygram, Bart.; H. Dyer, London; J. C. James, Thornbury; J. Clark, Coupar Angus; J. W. Axe, London; J. Woodger, London; A. Broad, London; J. J. Sperring, Dublin; J. F. Murray, Tralee; A. E. Macgillivray, Banff; R. F. Frost, A.V.D., Rangoon.

BOOKS AND PAMPHLETS: *J. Mandel*, Du Sacrifice des Animaux de Boucherie; *E. Strasburger*, Ueber den Bau und das Wachsthum der Zellhaute; *C.* and *P. Petersen*, Forschungen auf dem Gebiete der Viehaltung und ihrer Ergebnisse; *J. Woodroffe Hill*, Bovine Medicine and Surgery; *C. Müller*, Die Verbreitung der Ansteckenden Thierkrankheiten in Preussen Während des Quartals April-Juin, 1882.

JOURNALS, ETC.: *Journal of Anatomy and Physiology; Nature; Clinica Veterinaria; American Veterinary Review; Annales de Médecine Vétérinaire; Journal de Médecine Vétérinaire et de Zootechnie; Recueil de Médecine Vétérinaire; Der Thierarzt; American Live Stock Journal; Wochenschrift für Thierheilkunde und Viehzucht; Kennel Review; Australasian Veterinary Journal; La Presse Vétérinaire; L'Echo Vétérinaire; Archives Vétérinaire; Live Stock Journal; Revue Vétérinaire; Repertorium der Thierheilkunde; Medical Press and Circular; Lancet; Proceedings of the Medical Society of Kings; Edinburgh Medical Journal; Deutsche Zeitschrift für Thiermedicin und Vergleichende Pathologie; British Medical Journal.*

NEWSPAPERS: *Bedford* (*Cape Colony*) *Guardian; Adelaide* (*Cape of Good Hope*) *Opinion* (3 *copies*); *Dublin Evening Telegraph; Darlington News and Stockton Times; Sport; Irish Sportsman; The Colonial* (*Picton*) *Standard; Montreal Gazette; Sporting Gazette; Lahore Civil and Military Gazette; Rangoon Times.*